Technical Note
EdTech Readiness Index (ETRI)

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0 INTRODUCTION

The World Bank is collaborating with Imaginable Futures and is developing an EdTech Readiness Index (ETRI) to support countries in assessing where they stand on education technologies. The ETRI aims at capturing key elements of the ‘ecosystems’ within the education and technology sectors in a given country whose development are considered critical if investments in ‘EdTech’ are likely to bear fruit.

As countries and international partners gear toward catalyzing EdTech to help unlock education’s promise, there is a clear need for global tools to help inform policy and investment decisions and monitor related progress (or lack thereof). Standardized measures need to be developed to allow for benchmarking and to set targets that are globally comparable; this is the motivation behind the ETRI.

This technical note outlines some technical aspects of the overall project as well as the field work, instruments, indicators, and scores. The purpose is to be transparent about the technical decisions that have been made in collecting the data and developing the indicators of the ETRI. The World Bank is committed to continuing to improve the Index, so comments on these materials are very welcome. (See the link on the intranet: https://worldbankgroup.sharepoint.com/sites/gsg/innovation/pages/edtech-readiness-index-etri-04052021-223001.aspx).

The note is divided into three sections that cover the: 1) development of the instruments, 2) field work, and 3) indicator computation. These three sections are followed by an annex that provides links to additional relevant information.
1 DEVELOPMENT OF THE ETRI INSTRUMENTS

The indicators of the ETRI are organized following the three same dimensions of the World Bank’s Global Education Policy Dashboard\(^1\) — practices (or service delivery) and policies, two dimensions that can impact the expected outcomes, that is learning. The indicators on practices and policies have been developed for six overarching components: school management, teachers, students, devices, connectivity, and digital resources.

Overall, the indicators will be populated with data collected using two surveys: A School Survey and a Policy Survey. Each country will complete the two. Questionnaires for both surveys are available in English and Spanish and additional translations can be made available as part of the implementation in each country as needed.

1.1 SCHOOL SURVEY
The School Survey seeks to collect (remotely or in-person) information about school practices and the application of specific policies that are believed to play an important role in ensuring EdTech is well integrated within the education system. In doing so, the Survey captures the *de facto* (in practice) implementation of the policy frameworks as they relate to education and technology in schools. The school survey includes 47 questions structured around 6 sections and is expected to take ~40 minutes to administer.

The approach to the data collection will vary depending on country context. If social distancing restrictions due to COVID allow it, an in-person data collection approach can be selected. Otherwise, or if preferable for other reasons (e.g. budget), a remote data collection approach can be selected.

- For in-person data collection, the ETRI questions will be integrated in the GEPD schools survey instrument. Respondents will be the school’s principal as well as one grade 5 teacher.
- For remote data collection, respondents can the school’s principal as well as one grade 5 teacher (in charge of math or language) or the school principal only (if it would be difficult to reach and interview teachers by phone) who will be asked to report on the experience of a grade 5 teacher in the school. In this case, it is expected that the ETRI would be implemented independently from the GEPD.

Other implications of the data collection approach on sampling, replacement, and field work are highlighted in the sections that follow.

1.2 POLICY SURVEY
The Policy Survey seeks to collect information about the existence of specific policies that are believed to play an important role in ensuring EdTech is well integrated within the education system. In doing so, the Survey captures the comprehensiveness of the policy frameworks as it relates to education and technology. This Survey does not consider the extent to which these policies are implemented, their de

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\(^1\) https://www.educationpolicydashboard.org/
facto implementation, but rather focuses on their *de jure* existence. The Policy Survey has a total of 35 questions across 10 sections.

The methodology for the Policy Survey followed is based on the *Systems Approach for Better Education Results (SABER)*[^1], a World Bank initiative that produces comparative data and knowledge on education policies and institutions, with the aim of helping countries systematically strengthen their education systems and promote Learning for All. This methodology has been applied and used over 400 times across more than 130 countries and across multiple education policy domains.

This Policy Survey collects data about the most recent policies adopted, passed, enacted, and implemented in each country around ICT in education. The policies considered should be the most recent at the date when the questionnaire is being completed. In most countries, the policy framework assessed will be that of the central government. In large countries (with populations above 150 million) and/or federal states, where the implementation of the ETRI is limited to one province/state, the policies considered/reviewed will be those governing that province/state.

In each country, a national expert in education and technology is identified. The expert, hired as a consultant, will independently complete the self-administered survey. The person hired to complete the Policy Survey would qualify as a national expert on ICT education in the country where the ETRI is being implemented. Ideally, to ensure consistency, only one person should complete the Policy Survey by conducting a thorough legislative review. In questions where the answer is not easily found or the consultant can benefit from further clarification, the consultant may reach out to relevant public officials, as needed. In addition to the Policy Survey, the consultant will also be required to complete a context report that is related to the national education context and the role of EdTech within this environment. The context report will be structured according to key themes outlined in the guidelines, including national background, governance, students, teachers, EMIS, platform and devices and the COVID-19 pandemic.

[^1]: https://saber.worldbank.org/index.cfm
2 Sampling and Power for the School Survey

2.1 Sampling Overview

The goal of the sampling process is to draw a probabilistic sample that is representative of the target population of schools (at the national or subnational level) and that would allow the detection of changes over time at a minimum power of 80% and at a 0.05 significance level. Furthermore, the sample should allow for comparison between rural and urban schools. We will disaggregate answers by gender (of school principal for remote data collection, as well as of the teacher for in-person data collection). In some countries, if this is of key interest to the client, the quality of the sampling frame allows and sufficient funding and implementation capacity is available, the sample may be structured to be representative at the regional/provincial/state level but this would require a larger sample and increase the cost of data collection.

2.2 Sampling Frame

The sampling frame used for the survey will be a complete list of all primary sampling units (PSU), namely the primary schools. The sampling frame used will be the national database of primary schools available from Education Management Information System (EMIS), or equivalent officially recognized information system of national education data. In countries where a large proportion of students attend private schools, consideration should be given to establish a sample frame that include both private and public primary schools.

Minimum requirement: The construction of a nationally- (or sub-nationally-) representative sample is reliant on a complete list of primary schools within the country with high quality records (i.e. accurate classification and contact information). The sample frame includes all schools which meet the following minimum requirements, which differ depending on the data collection approach selected:

<table>
<thead>
<tr>
<th>In-person data collection (embedded in the GEPD)</th>
<th>Remote data collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>One teacher in the grade targeted for ETRI (generally grade 5), one 4th grade teacher and three 4th grade students, and one grade 1 teacher/class according to the latest school census</td>
<td>One teacher in the grade targeted for ETRI, according to the latest school census</td>
</tr>
<tr>
<td>At least one contact information (phone number, email address, or other (whether the school, the principal, or a teacher)</td>
<td></td>
</tr>
</tbody>
</table>

The contact information is necessary if the School Survey is carried out remotely.

Quality: The quality of the sample frame should be established before drawing the sample. To develop the sampling frame, the ETRI Team will work with the World Bank country teams and country counterparts to source and compile an up-to-date database containing comprehensive school information. Where possible, the team will take measures to ensure that the school information (name, principal contact information, region, etc.) is as reliable and accurate as possible.
If the remote data collection approach is selected, the quality of the sampling frame will be dependent on ensuring that the school contact information and principal details have been updated or used and validated at least once within the preceding two years. Where the availability of contact information in EMIS/the national database is low, the team should attempt to complete the database to the extent possible using complementary sources such as an HR database (with Ministry of Education (MOE) or Ministry of Labor or Public Service) or make use of any training/events/payment processes that will take place prior to the implementation of the sampling process to ask for contact information.

2.3 Sampling Approach

A stratified random sampling procedure will be used. This sample will be stratified based on the urban vs. rural classification of the school and the region in which the schools are located. Stratification allows for the reduction of sampling error\(^3\), such that sampling errors then depend on the population variance within strata but not between strata. Where notable differences exist between sub-groups of the population (e.g. urban vs. rural areas), stratification allows for a flexible sample design that can be different within each sub-group.

Multi-level stratification will be employed whereby schools from the national database are divided into first-level strata based on location, following which first-level strata are further sub-divided by urban-rural classification within each region. For location, the 1\(^{st}\)- or 2\(^{nd}\)-level administrative division will be used. In most cases, the 1\(^{st}\) administrative division is province/state/department-level, while the 2\(^{nd}\) division corresponds to districts. In country cases where private schools are also included in the sampling frame, the public/private classification of the school will also be included as a stratification variable.

Within each country, the sampling strategy will be adapted to reflect the specific country characteristics and requirements. For regional stratification, the ETRI team will work with partners within the country to ensure that all relevant geographical divisions are included at the appropriate level.

To develop the stratified random sampling procedure, several sampling experts at the World Bank were consulted on the best strategies for school sampling. In cases where the team has access to comprehensive school-level data, the team may use the Barcaroli stratified sampling technique (2014)\(^4\), which uses a genetic algorithm to determine the best stratification for a population frame i.e. one that determines the optimal number of strata within a sample that satisfy precision constraints. Optimal stratification can reduce sampling error compared to alternative approaches such as cluster sampling or simple random sampling.\(^5\)

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\(^3\) Sampling errors arise when a sample does not represent the total population and are defined as the difference between the true mean values of the population and the mean values of the sample. They can be statistically evaluated after a survey.


\(^5\) This optimal stratification approach is particularly useful if relevant data on schools is available from previous surveys. The optimal stratification algorithm will assign extra units to any stratum that has particularly high variance in the target variables. For instance, if previous nationally representative surveys are available, the mean and standard deviation of target indicators can be calculated (e.g. principal knowledge of education policies). Based on these results, extra sampling units can then be assigned to strata with high variances in these outcomes. To the extent that regions/strata have with a high variance in these outcomes also have high variance in other outcomes (e.g. school practices, teacher practices), the expectation is that this sampling approach will improve the precision in these measures as well.
2.4 Sample Size

Sample size: The target sample size will be 200-300 schools from the sampling frame. This figure is the minimum number of schools that achieves the desired survey precision for the key indicators of the index. In cases where the sampling frame is established at the provincial/regional/state level and more than one of these provinces/regions/states is targeted, the sample size will be larger.

In the case of remote data collection with only the principal as respondent, a one-stage sample design will be used. In the case of in-person data collection or remote data collection with principal and one teacher as respondents, a two-stage sample design will be used. When collecting data in-person, in the second stage, if there are more than one grade 5 teacher, one of them will be selected randomly. This selection is done by enumerators in the field at each school or on the phone after completing the principal interview.

2.5 Replacement and Non-response Adjustment

While the data collection will aim for a specified response rate, non-response might be expected in cases where the fieldwork team is not able to speak to the targeted respondent. Non-response is a concern as non-contactable respondents might be systematically different from those who could be contacted and were able to complete the survey.

The definition of non-response differs slightly depending on the data collection approach used. The probability of non-response is likely higher in the context of remote data collection. Non-response will be defined as a case where an enumerator marks the school as unreachable because:

<table>
<thead>
<tr>
<th>In-person data collection</th>
<th>Remote data collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indirect</td>
<td>The principal/teacher refuses to be interviewed by not responding to phone calls during or following the screening process (see below)</td>
</tr>
<tr>
<td>The schools cannot be located in the field</td>
<td>The principal/teacher refuses to be interviewed at the consent stage</td>
</tr>
<tr>
<td>Direct</td>
<td>The principal/teacher refuses to be interviewed before or during the consent process</td>
</tr>
<tr>
<td>The principal/teacher refuses to be interviewed at the consent stage</td>
<td></td>
</tr>
</tbody>
</table>

For a school/respondent to be classified as having refused indirectly, the field team must have made several attempts to contact that respondent to carry out the survey. These attempts should be carried out on different days of the week and at different times of the day (during work hours and after hours). When collecting data remotely, it will also involve attempting to contact all available numbers for this respondent. When collecting data in-person, if the school is difficult to locate physically, this will also involve obtaining directions to the school from different actors (district officers, local leaders, etc.)

In the case of non-response, the team will be allowed to select up to four schools from a list of replacement schools. The four replacement schools will be randomly selected for each school within the primary sample within the same district. Selecting the replacement school in the same district is logistically necessary for in-person data collection and the same strategy will be used in the case of remote data collection to maximize comparability.
2.6 **Survey Weights**

To draw valid statistical inference from the data, the sample should be representative of the target population to reduce bias and to keep the sample distribution close to that of the target population distribution. This can be achieved using survey weights, which will be constructed using the original sampling frame for each country. For each school, the weight is the inverse probability of this school having been randomly selected for the survey. The exact formula will depend on the selection procedure for selecting schools. In all cases, stratification is used, in which case the probabilities referenced above are computed within each stratum.

Where \( m \) is a measure of school size (number of primary level students at that school) and \( n \) is the number of schools selected per stratum, the weight for school \( i \) within stratum \( j \) is:

\[
SW_i^j = \frac{\sum_{i=1}^{N_j} m_i}{n \times m_i}
\]

In the case of in-person data collection, for teacher-level data, the team also adjusts for the random selection of teachers/classes that takes place within schools (if there is more than one grade 5 teacher). To derive these weights at the individual level, the school weight is multiplied by the number of units sampled (one teacher for the teacher interview) divided by the total number of units available to be sampled in the school.

In order to produce a nationally representative mean for an indicator, once the stratum weights are formed, we will produce a mean within each stratum and then average these stratum means with weights based on the size of the stratum:

\[
\bar{X} = \frac{1}{N} \sum_{j=1}^{N} N_j \times \bar{X}_j
\]

where \( X_j \) is the weighted mean for stratum \( j \), \( N_j \) is the number of schools in the stratum and \( N \) is the total number of schools at the national level. Standard errors are calculated as follows:

\[
SE(\bar{X}) = \sqrt{\sum_{j=1}^{N} \left( \frac{N_j}{N} \right)^2 \left( \frac{N_j - n_j}{N_j} \right) \hat{s}_j^2 \}
\]

Where \( \hat{s}_j^2 \) is the sample standard deviation in stratum \( j \) and \( n \) is the number of sampled units/schools in stratum \( j \).

In cases where there is non-response, the sampling weights will be adjusted by including an adjustment term to account for non-response.
2.7 **Power and Cost**
All surveys must balance the cost of conducting the survey with the resulting precision of the estimates. One goal of the ETRI is to provide a signal of EdTech readiness through a set of indicators, using a light instrument that is run at relatively low cost.

For remote data collection, the ETRI team set a budget of around $25,000 for the total cost of data collection, which includes the cost of contracting a local survey firm/team of enumerators and the implementation of the phone survey. For in-person data collection, the same cost is set as the ETRI questions is expected to be embedded within the GEPD school survey.

While survey cost is an important consideration, the minimum detectable effect size is also important for understanding the tradeoff between budget and precision. Any effect size below the minimum detectable effect size will not be statistically distinguishable from an effect of zero. For each country implementing ETRI, technical support will be provided to determine the exact sample size needed to ensure sufficient power.

3 **Field Work and Data Processing**

3.1 **Announcement**
The first step of the fieldwork will be to announce the upcoming survey. The objective of the announcement is to reassure the principals and teachers who will be contacted that this is a legitimate activity. The form of this announcement will vary by country. It could be a letter, an audio or video message, a post on a website, etc. This announcement could be made public and accessible to all principals and teachers or only staff from selected and replacement schools. It is recommended that this announcement include a call-in number for the MOE (central/district), for the team managing the survey, and possibly for teacher unions that the principal can contact to verify the legitimacy of the survey.

3.2 **Incentives for Respondents**
Depending on the context, for remote data collection, incentives could be provided to encourage participation given that it will require using airtime and/or internet. Principals/teachers who complete the survey could be sent airtime (phone credit). Furthermore, their school could be included in a raffle which will give them a chance to win a prize. The value of the airtime and the nature of the prize can vary by country but should be aligned with local prices and expectations.

3.3 **Screening Process (for remote data collection only)**
If remote data collection is selected, a screening process will be carried out prior to the survey itself, to identify the final sample. This process will involve attempting to contact schools of the primary and replacement samples (using multiple approaches, if needed) to answer a series of screening questions. A screening form will record (i) whether the phone number of the sampling frame is correct and functional, (ii) additional phone numbers and contact information, (iii) instructions with regards to information to be gathered prior to the interview, and (iv) an appointment date and time for the next phone call during which the interview will take place.
When carrying out the screening, the field team should follow a decision tree such as the one illustrated in Figure 1.
Figure 1: Example of decision tree for screening process (remote data collection only)

Send message or call all provided contacts for a given school. Record phone number(s) provided in response to this message.

At least one phone number available. Start with first one on the list

Call phone number

Functioning

Reaches the principal

Reaches someone other than the principal (teacher, PTA, etc.)

Reaches someone not directly connected to the school

Obtain a new phone number for the principal

Obtain a new phone number for someone else connected to the school

Begin interview process

Not functioning (no response, disconnected, etc.) after X attempts

No other or new phone numbers

Other phone numbers available, move to next on the list

Mark the school as “no-response”. Start over with the next replacement school.

No phone number available after X days
3.4 INTERVIEW PROCESS
Once the principal has been reached, the enumerator will complete the interview process. The enumerator should do the following:

a. Introduce themselves as working for the recruited survey firm and carrying out a survey on behalf of the relevant Ministry with support from the World Bank.
b. Confirm that it is a good time to speak to the respondent, or schedule another time if not
c. Complete the informed consent process (which includes providing an overview of the purpose of the survey, describing how collected data will be used, explaining available incentives, describing the interview process and allowing the respondent to opt out of the survey)
d. Provide a time estimate of how long the survey will take (for each phase, if remote)
e. Record any other contact information for this principal/school (other phone numbers, email address(es), etc.)
f. Administer the full School Survey questionnaire.
g. Record the survey responses on the electronic form provided. ETRI uses Survey Solutions data collection software, which is a tablet-based, free, open-source survey tool designed by the World Bank.
h. If a teacher is respondent: List the name of the grade 5 math and language teachers and use the tablet functionality to randomly select the teacher to interview and obtain the phone number of this teacher from the principal.
i. Thank the principal for his/her time.

The process for interviewing the teacher is the same as above with the exception of step h which is skipped.

3.5 ANONYMIZATION AND CONFIDENTIALITY
Confidentiality is an important aspect of the data collection for the School Survey as principals (and teachers if in-person) provide their views on government policies and practices related to the implementation of EdTech in their school. Ensuring anonymity has important implications for an individual’s willingness to respond honestly and openly to the questionnaire. A strict protocol will be followed to ensure confidentiality and security of the data collected.

In the case of data collected in electronic format, data will be collected using Survey Solutions software, which encrypts data while it is transmitted, using SSL. The server which stores this data can also keep the data in encrypted format. Once downloaded from the server, incoming data will be stored in an encrypted folder using encryption software and will immediately be anonymized, removing all personally identifiable information (PII) including: enumerator name, school name, address, official school code (EMIS), principal name, phone number(s) and geographical information. The process will also produce a unique respondent ID, province ID, categorical values for the year the principal began teaching, categorical values for number of students and devices, categorical values for educational attainment and other categorical top-coded variables.

If paper surveys are used (this is the least preferred option and would only be a possible in the case of in-person data collection), they will be formatted such that PII can be removed from the hard copies after
the data has been captured electronically. Hard copies will be securely stored in locked locations and will be destroyed after a defined period.

Only authorized team members will be able to access the data, which will be stored in access-controlled encrypted. Data will be processed and analyzed from password-protected computers. All individual identifying information will be excluded from any reported results.

### 3.6 DATA QUALITY CHECKS

The team has implemented several measures to ensure that the data collected are of high quality. The electronic version of the School Survey includes inbuilt constraints and verifications to ensure that data are captured as completely and accurately as possible. These include enforcing that required questions are completed, implementing range-checks (e.g. number of years taught, year the principal first took their current position, etc.) and custom validation (e.g. number-only entry for numerical questions, the number of Grade 5 students does not exceed the total number of students in the school, the number of devices connected to the Internet does not exceed the total number of devices, etc.).

During the data collection, the team will run daily quality checks. These include standard high-frequency checks and custom-designed quality checks for the School Survey. Such checks will include duration of the survey, missing values, survey completion times, other anomalies and enumerator-specific checks e.g. number of completed surveys, average survey duration, call times, etc.

In the case of remote data collection, back-checking will also be implemented: 10% of the surveys will be randomly selected and dedicated enumerators will be asked to re-interview respondents using sub-sections/a shortened version of the original survey. If possible, this re-interview will be done in-person. If not, the re-interview will be done by phone. The goal of the back-checking process is to check whether the questions were well understood or idiosyncrasies in the original of the surveys (time, enumerator, distractions, etc.) influenced the answers provided. The responses will be compared to the original survey and discrepancies will be flagged where responses deviate from the original survey. Where these exceed acceptable deviation percentages for each question, these will be analyzed and addressed accordingly e.g. re-training enumerators, modifying problematic questions, etc. The back-checking will be done on a continuous basis during the survey implementation to identify problems and implement appropriate course-correction early.

### 3.7 DATA FLOW

The raw data is hosted on a secure server through Amazon AWS, which is certified by numerous international bodies, including the EU Data Protection Directive. The data flow is as follows:

1. Data is collected by an enumerator
2. The enumerator or their supervisor uploads the collected data to the cloud secure server on AWS
3. The data is encrypted on the server
4. The ETRI team downloads the encrypted data using the Survey Solutions API
5. The data is stored in a secure folder within the World Bank network
6. The ETRI team cleans the data and creates encrypted unique IDs for principals and schools using cryptographic hashing and running a fully automated R-code
6. Data quality checks are run using R-code to minimize missing values, identify enumerator errors, and ensure accurate coding.

7. The data is then anonymized using R-code that removes all personal identifiable information (PII) information.

8. The final indicators are calculated and aggregated to the national level (and relevant breakdowns) using R-code.

9. This aggregated data is uploaded to the World Bank’s Edstats open data platform. The ETRI/GEPD website pulls the data from EdStats using the EdStats API system.

4 Indicator Construction

The data collected is reported as aggregate scores that are averaged across all schools in the sample (or in applicable groupings) for a total of 18 indicators. These 18 indicators cover all 6 pillars for the practice and policy dimensions, where the policy dimension is further broken down into a De Facto and a De Jure. Each indicator has a value range between 1 and 5 for Practice and Policy, which is computed using answers to questions mapped to this indicator. Scores are grouped and broken down accordingly by strata (e.g., rural vs. urban). More details on the indicators are provided in table 1 (next page). Detailed computation of each indicator score is described in the ETRI Metadata document.

Indicators are given a color to pinpoint areas for improvement and descriptive statistics related to the underlying questions are provided. The color coding follows a traffic light color scheme and is determined by the cut-off/threshold in the value of each indicator (table 2). These thresholds could be reassessed after the ETRI pilot phase (2023).

Table 2: Color Coding According to Scores

<table>
<thead>
<tr>
<th>Score</th>
<th>Color</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2.99</td>
<td>Needs improvement</td>
<td>Data indicates that performance and the quality of the practice/policy is not satisfactory, and a series of improvements are needed.</td>
</tr>
<tr>
<td>3-3.99</td>
<td>Caution</td>
<td>…can be improved. Although it is not in a critical stage, a series of actions will be needed to achieve a satisfactory level.</td>
</tr>
<tr>
<td>4-5</td>
<td>On target</td>
<td>…is satisfactory to a great extent.</td>
</tr>
</tbody>
</table>
### Table 1: Overview of the Indicators

<table>
<thead>
<tr>
<th>Pillar</th>
<th>Level</th>
<th>Questionnaire</th>
<th>Definition</th>
<th>Aspects tracked</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>School Management</strong></td>
<td>1</td>
<td>Practices</td>
<td>School Survey</td>
<td>Readiness of the school management to use and promote the use of ICT in education.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>De Facto Policies</td>
<td>School Survey</td>
<td>The principals’ awareness of the role of school management in using and promoting the use of ICT in education.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>De Jure Policies</td>
<td>Policy Survey</td>
<td>The existence of key elements in the policies that enable school management to use and promote the use of ICT in education.</td>
</tr>
<tr>
<td>Teachers</td>
<td>4</td>
<td>Practices</td>
<td>School Survey</td>
<td>The readiness of grade 5 teachers to integrate ICT in their class instruction.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>De Facto Policies</td>
<td>School Survey</td>
<td>The principals’ awareness of grade 5 teachers’ ICT skills and teachers’ professional development.</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>De Jure Policies</td>
<td>Policy Survey</td>
<td>The existence of key elements in the policies that enable teachers to efficiently use and teach ICT in education.</td>
</tr>
<tr>
<td>Students</td>
<td>7</td>
<td>Practices</td>
<td>School Survey</td>
<td>The performance of grade 5 students in using ICT in and outside school.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>8</td>
<td>De Facto Policies</td>
<td>School Survey</td>
<td>The principals’ awareness of key elements in the policies that enable students’ performances on ICT and their assessment.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>De Jure Policies</td>
<td>Policy Survey</td>
<td>The existence of key elements in the policies that enable students to efficiently use and by assessed by and on ICT.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>De Facto Policies</td>
<td>School Survey</td>
<td>The principals’ awareness of key elements in policies related to digital devices in schools.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>De Jure Policies</td>
<td>Policy Survey</td>
<td>The existence of key elements in the policies related to digital devices in schools.</td>
<td></td>
</tr>
<tr>
<td>Connectivity</td>
<td>13</td>
<td>Practices</td>
<td>School Survey</td>
<td>The readiness of schools to connect students to internet.</td>
</tr>
</tbody>
</table>

- **Students**
  1. the **self-efficacy** of students in using ICT
  2. the **use/frequency** with which students use ICT **inside** the school
  3. the **use/frequency** with which students use ICT **outside** the school.

- **De Facto Policies**
  1. the application/use of a competency **framework** for students
  2. the integration of ICT in activities in the **curriculum** and outside the school
  3. the application/use of an **assessment** of ICT competencies.

- **De Jure Policies**
  1. the existence of a competency **framework** for students
  2. the existence of guidance/tools to integrate ICT in activities in the **curriculum** and outside the school
  3. the existence of an **assessment** of students’ ICT competencies.

- **Devices**
  1. students’ **access** to the devices
  2. students’ **use** of the devices
  3. the existence of **technical support**.

- **De Facto Policies**
  1. the application/use of availability **standards**
  2. the application/use of **monitoring** tools
  3. the assignment of **responsibilities** for maintenance and support.

- **De Jure Policies**
  1. the existence of availability **standards**
  2. the existence of **monitoring** tools
  3. the assignment of **responsibilities** for maintenance and support.

- **Connectivity**
  1. the **availability** of connectivity
  2. student **access** to the internet
  3. the perceived quality of the connectivity.
<table>
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<th>Survey Type</th>
<th>Description</th>
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