

1.3 Method fragments¹

Document purpose

This document is developed in order to guide the assessor and project provider in the selection of relevant method fragments (i.e. indicators) to be used during the impact assessment process. This document should be used during two steps of the method, the first one being Select relevant method fragments, and the second one being Determine demographics of interest.

Every development project is different. Therefore, not every method fragment/indicator that is listed below is relevant for each impact assessment and development project. Also, every impact assessment might focus on a different demographic part of the population to be assessed. This document gives an overview of the 29 different method fragments, and their corresponding metrics. In this way, the document might support the assessor and project provider in creating a better overview of the indicators of interest.

List of Method Fragments (i.e. Indicators)

The method fragments which are displayed in **green** are used as default. These method fragments should be applied in each impact assessment, as they form a foundation for the evaluation.

General project	General national
General regional	Demographic
Accessibility	Additional effects
Affordability	Career
Cost-Benefit	Education level
Hardware infrastructure	ICT employment
Information needs	Internet availability
Internet usage	Livelihood
Local economy support	Network speed and quality
PC usage	Security
Self-efficacy	Service and support
Smartphone usage	Tablet usage
Teacher efficacy	Technology acceptance PC
Technology acceptance smartphone	Technology acceptance tablet
TPACK (Pedagogical-, technological-, and content-knowledge in teachers)	

¹ This document is a component of the Impact Assessment Method which is developed as part of the Master's Thesis of M.J.M. Smulders - Situational Method Engineering for ICT4D: Performing Impact Assessments for Educational Programs - at Utrecht University, in collaboration with Maxim Nyansa IT Solutions (2020).

Overview of Method Fragments and their Corresponding Metrics

Again, the method fragments which are displayed in green are used as default. Furthermore, it should be mentioned that the metrics which are mentioned in the tables below are collected in various ways and with various individuals (project provider, community/school leader, teachers, students).

General project

Metric	Data type
Number of schools reached (number of projects)	Numeric
Number of students reached	Numeric
Deployment rate (per month)	Numeric
Number of employees in school/project environment	Numeric
Number of students in school/project environment	Numeric
Total number of courses offered by school	Numeric
Total number of teachers	Numeric
Number of teachers with ICT literacy skills	Numeric
Number of teachers with teaching certification	Numeric
Number of teachers with ICT certification	Numeric
Number of new teachers in past year	Numeric
Number of teachers left in past year	Numeric
Average student grade overall	Numeric
Average student grade ICT class	Numeric
Repeater ratio	Numeric

General national

Metric	Data type
Unemployment rate national	Numeric
Unemployment rate youth (ages 15-24) national	Numeric
Gross domestic product (GDP) per capita	Numeric
Most recent poverty headcount ratio at \$1.90 a day (2011 PPP) (% of population)	Numeric
Average grade for target students (national)	Numeric
Child enrolment (number of children not in school ages 5-14) national	Numeric
Average student grade ICT class (national)	Numeric
Repeater ratio (national)	Numeric

General regional

Metric	Data type
Unemployment rate target region	Numeric
Unemployment rate youth (ages 15-24) target region	Numeric
Average grade for target students (regional)	Numeric
Child enrolment (number of children not in school ages 5-14) regional	Numeric
Average student grade ICT class (regional)	Numeric
Repeater ratio (regional)	Numeric

Demographic

Metric	Data type
Age	Numeric
Gender	MC Answer (Num)
Country	String
Place of residence	String
Place of school	String
School name	String
Education level	MC Answer (Num)
Number of times solicited	Numeric
Number of jobs	Numeric

Career

Metric	Data Type
Graduated	Binary
Job	Binary
Happiness with job	Likert (Num)
Satisfaction salary	Likert (Num)
Hindsight help of project	Likert (Num)

Cost-Benefit

Metric	Data Type
Recurring (variable) expenses of the ICT4D project per year (can include Internet subscriptions, stationery and other consumables, maintenance, phone connection costs, utilities, staff salary, etc.)	Numeric
Direct income generated by the ICT4D project per year (if applicable)	Numeric
Money saved from using the ICT4D project per year(if applicable)	Numeric
One-off (initial) expenses of the ICT4D project (can include ICT hardware and software costs, building renovation costs, other physical infrastructure costs, initial training, set-up costs, etc.)	Numeric

Education level

Metric	Data Type
Satisfaction ICT knowledge	Likert (Num)
Satisfaction level of education	Likert (Num)
Satisfaction ICT knowledge teacher	Likert (Num)
Satisfaction ICT level lessons	Likert (Num)
Satisfaction ICT quantity lessons	Likert (Num)
Education challenges	Likert (Num)

Accessibility

Metric	Data Type
Number of students in school/project environment that make active use of ICT facilities	Numeric
Number of hours a week that computers are freely accessible	Numeric
Number of days a week that computers are freely accessible	Numeric
Number of hours of computers usage scheduled for lessons	Numeric
Number of hours a week that computers are accessible for outsiders	Numeric
Access to personal accounts for students	Binary
Access to personal accounts for employees	Binary

Additional effects

Metric	Data Type
Wider effects community/personal	Binary
Type of effects community/personal	Binary

Affordability

Metric	Data type
Total expenditure of the school/project environment in US Dollars per year	Numeric
Internet costs in US Dollars per year	Numeric
Satisfaction internet costs	Binary
Maintenance costs of hardware in US Dollars per year	Numeric
Budget for ICT training teachers	Binary
Budget value for ICT training teachers in US Dollars per year	Numeric
Total revenue of the school/project environment in US Dollars per year	Numeric

Hardware infrastructure

Metric	Data type
Number of mobile phones available for staff (including personal mobile phones)	Numeric
Number of Personal Computers or laptops available	Numeric
Number of tablets available	Numeric
Number of printers available	Numeric

ICT employment

Metric	Data type
Motivation ICT professionals	Likert (Num)
Qualification ICT professionals	Likert (Num)
Retainment ICT professionals	Likert (Num)
Saturation ICT professionals	Likert (Num)
Importance of ICT literacy for career progression	Likert (Num)
Satisfaction with ICT lessons for career	Likert (Num)
Perceived chance of job	Likert (Num)

Information needs

Metric	Data type
Main sources of general information	Scale
Type of information needs	Scale
Availability digital educational material	Likert (Num)
Availability digital interactive educational content	Likert (Num)

Internet availability

Metric	Data type
Availability Internet connection	Binary
Internet download speed in MB per second	Numeric
Internet upload speed in MB per second	Numeric
Intranet availability	Binary
Number of PCs connected to Intranet	Numeric

Internet usage

Metric	Data type
Internet use before	Binary
Internet use importance	Scale
Satisfaction internet usage	Likert (Num)
Added value of internet in education	Likert (Num)
Added value of internet personal	Likert (Num)

Livelihood

Metric	Data type
Survival threshold	Likert (Num)
Protection threshold (1-3)	Likert (Num)
New skills (1-2)	Likert (Num) & Scale
Availability of support services	Likert (Num)
Community participation	Likert (Num)
Personal empowerment	Likert (Num)

Local economy support

Metric	Data type
Percentage of hardware items supplied by local parties	Numeric
Percentage of supplemental accessories (e.g. furniture) supplied by local parties	Numeric

Network speed and quality

Metric	Data type
Restore time network failure	Scale
Type of Internet connection	Scale
Number of local telephone calls successful on first attempt	Binary
Satisfaction internet speed	Likert (Num)
Internet speed institution better than internet cafes	Likert (Num)
Internet speed frustration	Likert (Num)
Perception restore time	Likert (Num)

PC Usage

Metric	Data type
Number of courses that are supplemented with PC usage	Numeric
PC usage for word processing	Binary
PC usage for spreadsheets and DBMS	Binary
PC usage for communication	Binary
PC usage for resources on Internet	Binary
PC usage for instruction	Binary
Used a computer before	Binary
Accessibility PC/laptop	Binary
PC usage location	Scale
PC usage purpose	Scale
Satisfaction computer availability	Likert (Num)
Added value of PCs in education	Likert (Num)
Added value of PCs personal	Likert (Num)
Perception of increased productivity	Likert (Num)

Security

Metric	Data type
Use of anti-virus	Binary
Physical security in place	Binary
Number of data backups per year	Numeric

Self-efficacy

Metric	Data type
Self-efficacy using windows computer	Likert (Num)
Self-efficacy perform word processing tasks	Likert (Num)
Self-efficacy entertainment	Likert (Num)
Self-efficacy information searching	Likert (Num)
Self-efficacy confident at school	Likert (Num)
Self-efficacy good use of internet	Likert (Num)

Service and support

Metric	Data type
Number of employees with hardware maintenance skills	Numeric
Failure frequency computer	Scale
PC failure restore time	Scale
Most common type of computer failure	Scale
Frequency power failure	Scale

Smartphone usage

Metric	Data type
Used a smartphone before	Binary
Smartphone accessibility	Binary
Smartphone usage purpose	Scale
Added value of smartphones in education	Likert (Num)
Added value of smartphones personal	Likert (Num)

Tablet usage

Metric	Data type
Used a tablet before	Binary
Tablet accessibility	Binary
Tablet usage purpose	Scale
Added value of tablets in education	Likert (Num)
Added value of tablets personal	Likert (Num)

Teacher efficacy

Metric	Data type
Efficacy for instructional strategies (1-4)	Likert (Num)
Efficacy for classroom management (1-4)	Likert (Num)
Efficacy for student engagement (1-4)	Likert (Num)

Technology acceptance PC

Metric	Data type
Perceived ease of use (1-2)	Likert (Num)
User satisfaction (1-4)	Likert (Num)

Technology acceptance tablet

Metric	Data type
Perceived ease of use (1-2)	Likert (Num)
User satisfaction (1-4)	Likert (Num)

Technology acceptance smartphone

Metric	Data type
Perceived ease of use (1-2)	Likert (Num)
User satisfaction (1-4)	Likert (Num)

T-PACK

Metric	Data type
Pedagogical knowledge (PK) (1-7)	Likert (Num)
Technological knowledge (TK) (1-4)	Likert (Num)
Content knowledge (1-4)	Likert (Num)
Interaction between pedagogical and content knowledge (PCK) (1-6)	Likert (Num)
Interaction between technological and pedagogical knowledge (TPK) (1-6)	Likert (Num)
Interaction between content and technological knowledge (TCK) (1-4)	Likert (Num)