

Scalability by Design: *Leveraging DACUM and AI to Standardize Implementation Fidelity in Global Educational Interventions*

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CIE implements the project Flexible Educational Trajectories - TEF

Project's Objective

Obtain evidence for scaling an educational model for out-of-school youth.

Work with a local organization as well as the Ministry of Education

- Grupo Ceiba
- Office of alternative education of the Ministry of Education of Guatemala

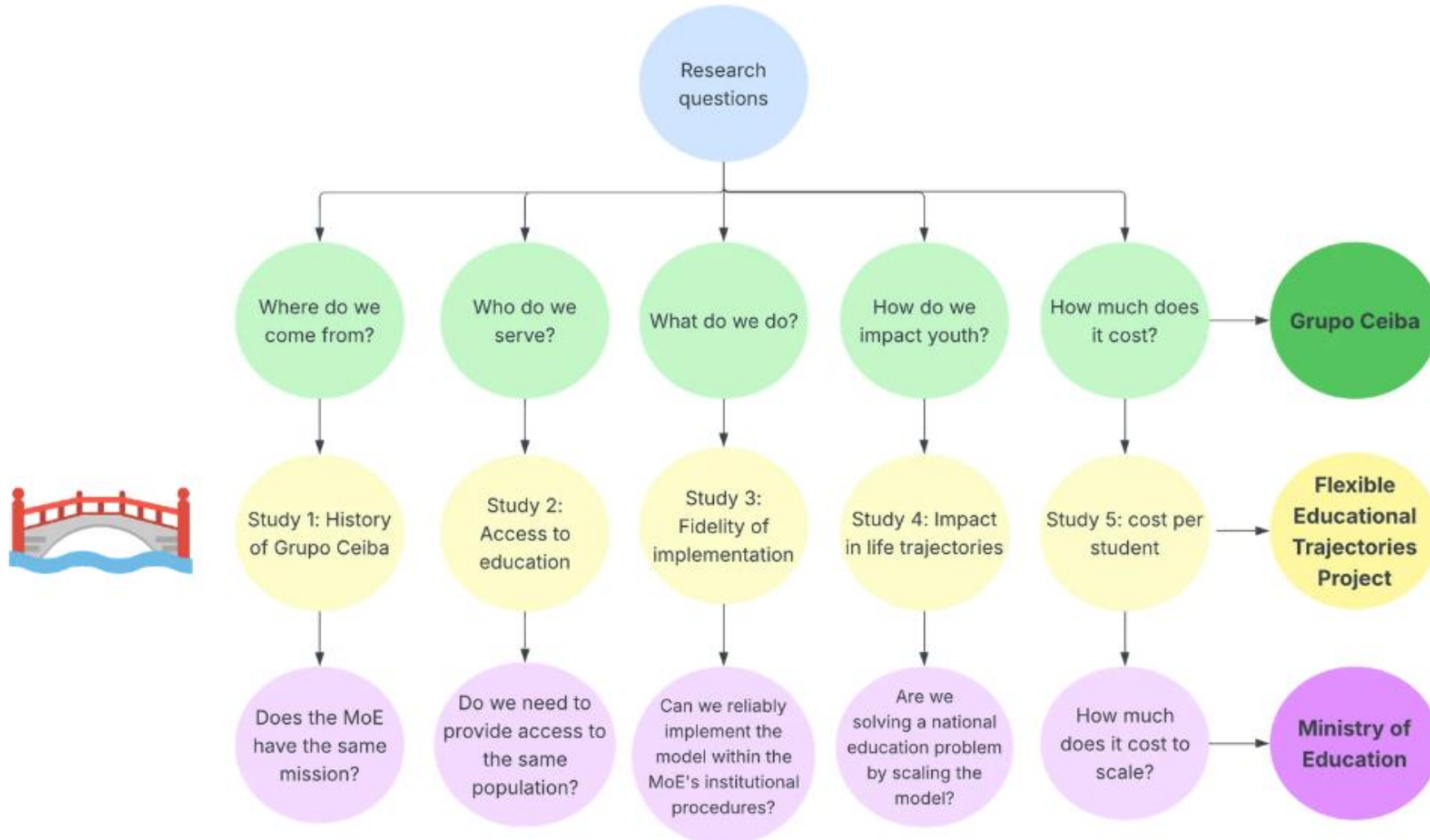
Grupo Ceiba

- This organization implements its own model of alternative education for out-of-school youth.
- It has received funds from the Ministry of Education since 2006

Office of Alternative Education

- Has shown interest in Grupo Ceiba's educational model
- And it is currently developing a national educational model for alternative education

Research for scalability



Fidelity of Implementation of Global Programs

Scalability Potential

The success of an educational intervention does not lie solely in local results, but in its potential for sustainable scalability across various contexts.

Fidelity of Implementation

Guaranteeing implementation fidelity is critical: an innovation may appear ineffective when the underlying problem is actually imprecise execution.

Sustainability depends on the consistency between the theoretical model and real-world practice.

Dimensions of Fidelity of Implementation



Adherence

The degree to which the structural components of the original design are followed.



Dosage

Amount of intervention received by the program's beneficiaries.



Quality

Teacher performance level and adaptability according to the context.



Response

Responsiveness and commitment of the participants involved.

A study of fidelity of implementation requires a valid and reliable observation checklist to evaluate at what extent the teacher implements tasks related to the educational model



To create the observation checklist to determine fidelity of implementation, we emphasized two methodological strategies.

DACUM



IA



| The **DACUM** Method

Developing A Curriculum

A collaborative methodology based on the premise that expert workers are the most qualified to define their own labor and tasks (to implement an educational model)

- Detailed occupational analysis.

- Identification of responsibilities and tasks.



Complexity and Difficulty of Tasks in the DACUM method



Complexity

Inherent property of the pedagogical design (the "what" and the "how"). Determined by information volume, interdependencies, and dynamic variability of the educational environment.



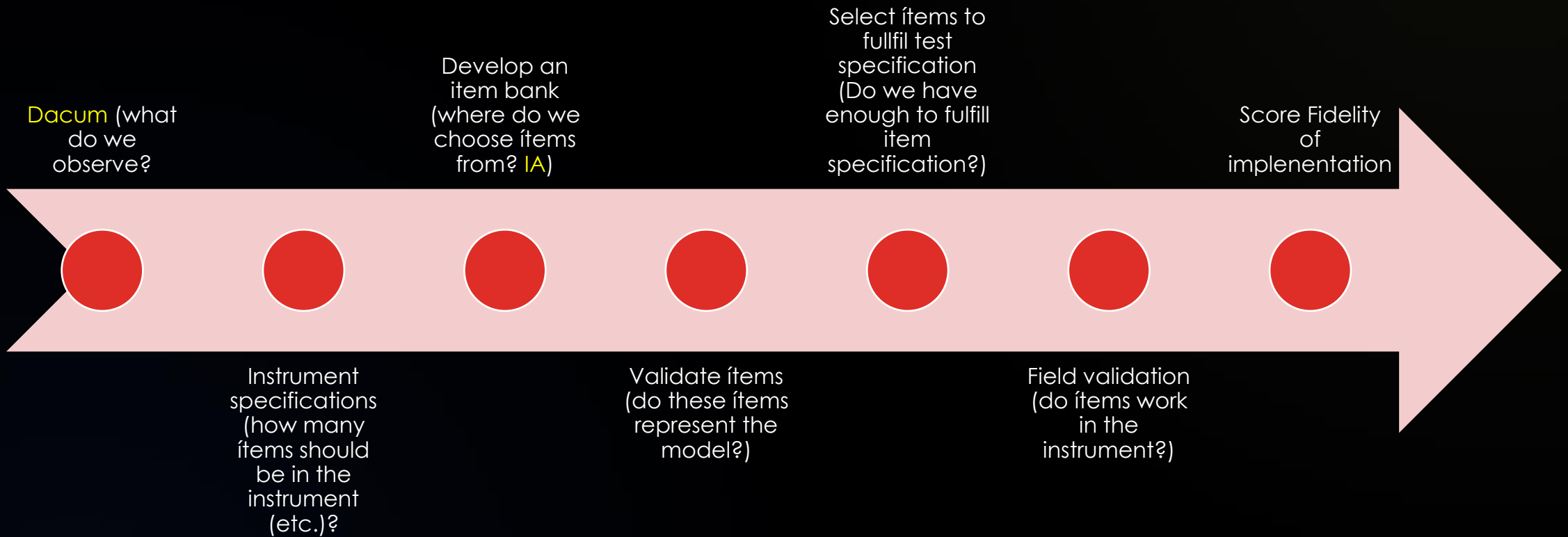
Difficulty

Redefined as operational feasibility in the field. Variable according to the mediator's interaction with their work environment and the resources available at each site.

The outcome of the DACUM method is a matrix of responsibilities and tasks of those who implement which feeds instrument's specifications

Area of responsibility of the facilitator	Number of items according to criticality index to be included in the instrument
Pedagogical agreement	14
Administration	9
Assessment	7
Monitoring	8
Maintenance	1
Divulgation	8
Total	47

The observation checklist development process



Artificial Intelligence

Google Gemini

AI was used for the exhaustive generation of a **bank of possible observation items**, acting as an accelerator of this phase.

- Dacum was the principal input of item generation.
- Model's regulatory documents as input.
- Specification for item writing structure.
- Unlimited amount of item generation



Validating Artificial Intelligence outcome

Item bank

IA produced 316 items distributed in 7 teacher responsibilities

Grupo Ceiba did an item validation session of such items

.44 items were selected by Grupo Ceiba to assemble the instrument.



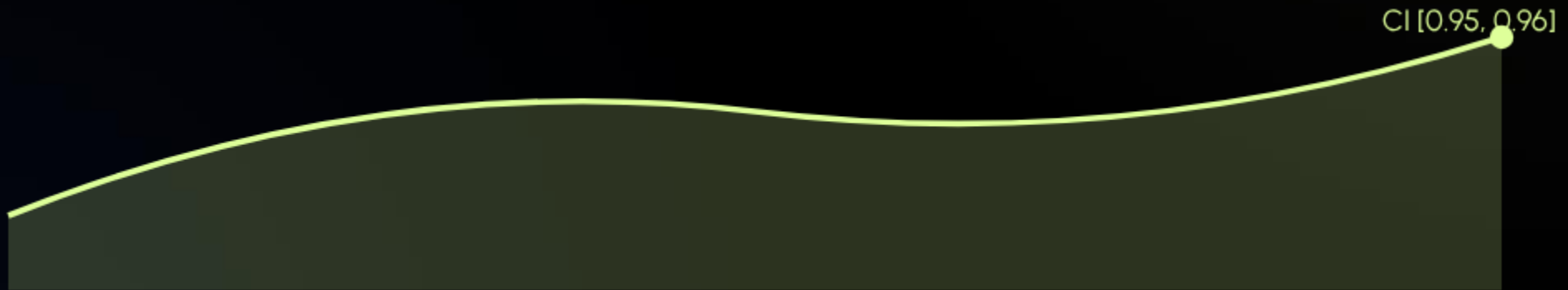
Field validation: students, teachers and inspectors



Field validation and psychometric analyses: Scale Reliability

0.96
Cronbach's Alpha

Excellent Consistency: The homogeneity is adequate (mean inter-item: 0.33). Item-total correlations exceed 0.40, confirming a strong discrimination capacity.



Field validation and psychometric analyses: Internal Factor Structure

"The presence of cross-loadings suggests the model functions as an integrated system."

MR1: General Implementation

Key Load

Dominant

Robust factor underlying the entire instrument.

MR3: Pedagogical Agreement

Key Load

0.648

Teaching and administrative tasks.

MR4: Monitoring

Key Load

0.658

Monitoring and administrative tasks.

MR2: Evaluation

Key Load

0.600

Student assessment.

Triangulation of fidelity results

Students

90%

95% CI
(0.88, 0.92)

Self-Evaluation

86%

95% CI
(0.83, 0.88)

Coordinators

84%

95% CI
(0.81, 0.87)

| Participant Analysis

Variability

Contrast Capacity

Coordinators deviate more in their evaluations compared to students and mediators. This is attributed to their ability to contrast work across diverse sites and locations.

Key Conclusions

Sustainable Base

Implementation fidelity is the indispensable foundation for any sustainable scalability effort.

DACUM

The methodology ensures that measurement validity as it focuses on concrete operational aspects of an educational model.

AI

AI is valuable for item generation to reduce time in various instrument development phases, but its application must always be subject to expert qualitative validation.

When following a process like this psychometric analyses were up to standard.





THANK YOU

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Image Sources



<https://us.images.westend61.de/0002003103j/a-multiethnic-team-engaged-in-a-collaborative-meeting-workshop-focusing-on-discussion-and-teamwork-diverse-professionals-working-together-around-a-conference-table-JLPSF32410.jpg>

Source: www.westend61.de



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