When Teachers and Computers Achieve the Best Combination:

A National Comparative Study of Face-to-face and Blended Teaching and Learning

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Definitions and setup

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- ▶ "Plan Ceibal": nationwide, one laptop per child

- ▶ "Ceibal en Inglés": EFL blended program
    - ▶ videoconference + LMS + face-to-face
    - ▶ RT from Filipinas, Argentina, Uruguay, Scotland, ...

- ▶ "Segundas Lenguas": EFL program, face-to-face

- ▶ Nationwide evaluation of both programs (adaptive online test

- ▶ Instrument to measure engagement in the LMS

Data

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Definitions and
setup

Results

Conclusions

- ▶ R + RODBC + RMySQL
- ▶ LMS logs
    - ▶ x_1 = num. of assignments submitted
    - ▶ x_2 = num. of files uploaded
    - ▶ x_3 = num. of comments
    - ▶ x_4 = num. of comments on submissions
    - ▶ x_5 = num. of days with comments on subm.
    - ▶ x_6 = num. of days with some activity
- ▶ Administrative info students: age, sex, socio-cultural context
- ▶ Administrative info teachers: Remote and Classroom Teachers
- ▶ Test: Vocabulary, Reading, Grammar (VRG) scores

Index of Engagement

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- Log or relative scale

  - $\pi = \prod(1 + x_i)$

  - $\pi = 1$ if all $x_i = 0$

  - $\pi \to \infty$ when $x's \to \infty$

- Re-scale and smoothing

  - $IEG = (\delta + 1)/\delta \times [(\pi/(\delta + \pi) - 1/(\delta + 1)]$

  - $IEG = 0$ when $\pi = 1$

  - $IEG = 1$ when $\pi \to \infty$

  - δ is a smoothing parameter, set to $\delta = 90$

IEG vs teaching modality

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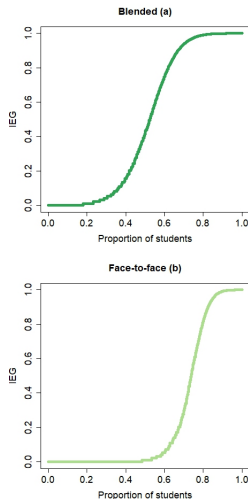
Definitions and
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Figure: Blended (a) and Face-to-face (b): IEG distribution by modality of English teaching.
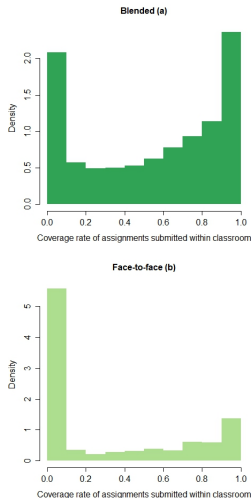
Intra group behavior

Figure: Blended (a) and Face-to-face (b): Percentage of students within a classroom with at least one submission by modality of English teaching.

IEG vs Performance Levels (1)

Table: Adaptive EFL test (VRG) levels obtained by levels of IEG.

	A0	A1-	A1+	A2-	A2+	Total
$IEG = 0$	1%	32%	35%	31%	1%	100%
$0 < IEG \leq 0.3$	1%	26%	32%	41%	1%	100%
$0.3 < IEG \leq 0.8$	0%	19%	28%	50%	2%	100%
$0.8 < IEG \leq 0.985$	0%	16%	27%	54%	3%	100%
$IEG \geq 0.985$	0%	10%	23%	62%	5%	100%

IEG vs Performance Levels (2)

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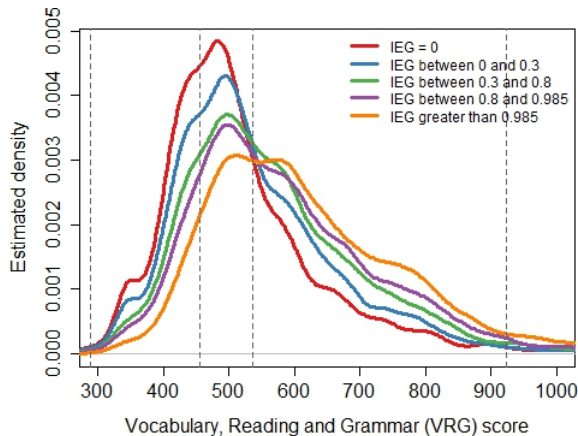
Figure: Blended students: estimated VRG score density by levels of IEG.

Conclusions and further work

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- ▶ Index to measure students' engagement in LMS

- ▶ Comparison of teaching modalities: Blended and face-to-face

- ▶ IEG higher for students in blended program

- ▶ *Intra* group clustering

- ▶ Positive correlation between IEG and test score (VRG)

- ▶ Include non structured data (comments, submissions)