THE EFFECTIVENESS OF OER USE IN STUDENT'S LOGICAL-MATHEMATICAL SKILLS: AN STUDY OF FIRST YEAR HIGHER EDUCATION STUDENTS IN CHILE

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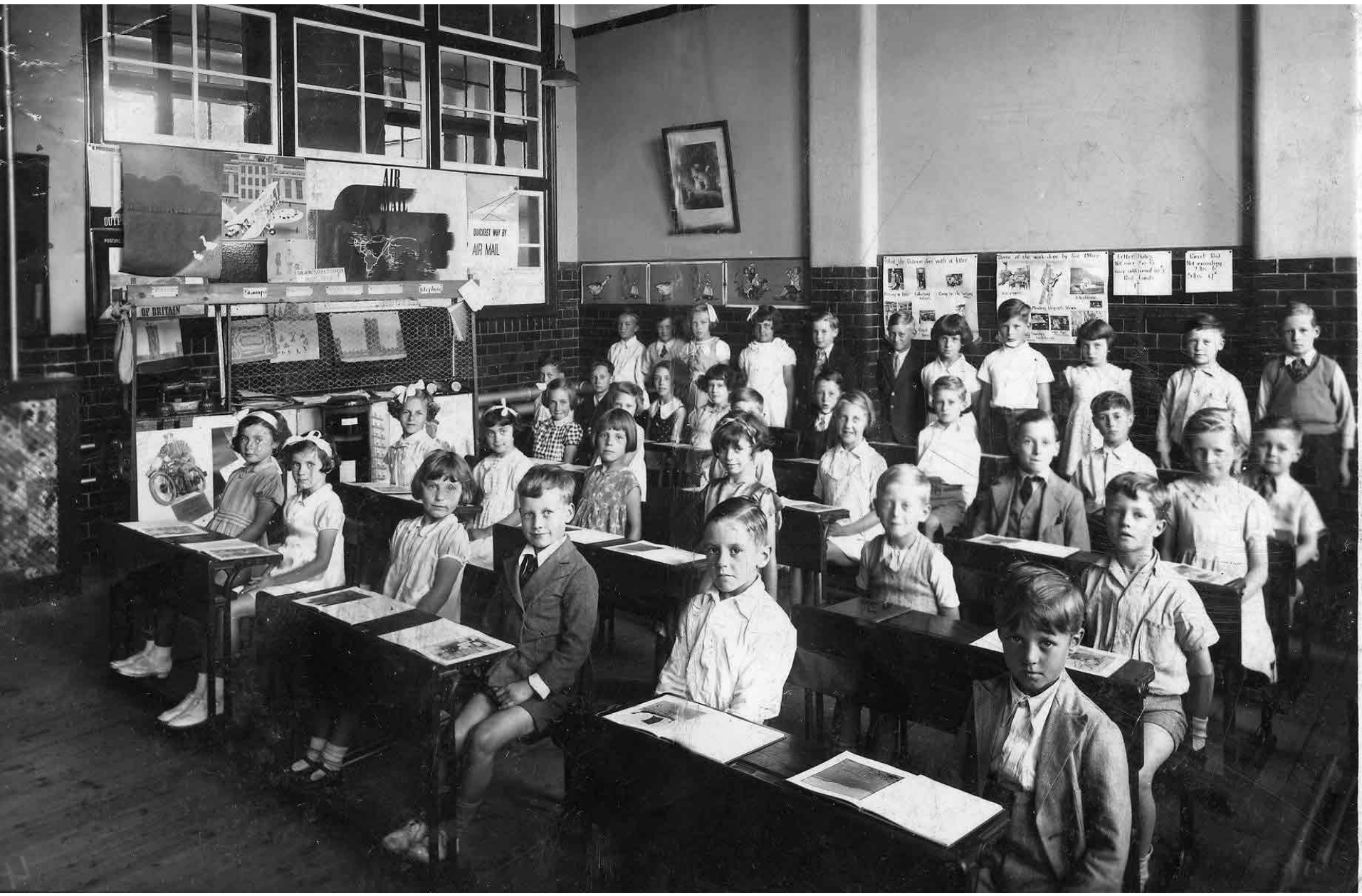
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María Montessori
(1870-1952)

The effectiveness of OER use in student's logical-mathematical skills:

An study of first year higher education students in Chile

Update Sub-project 9

Banff, Canada. April 2015

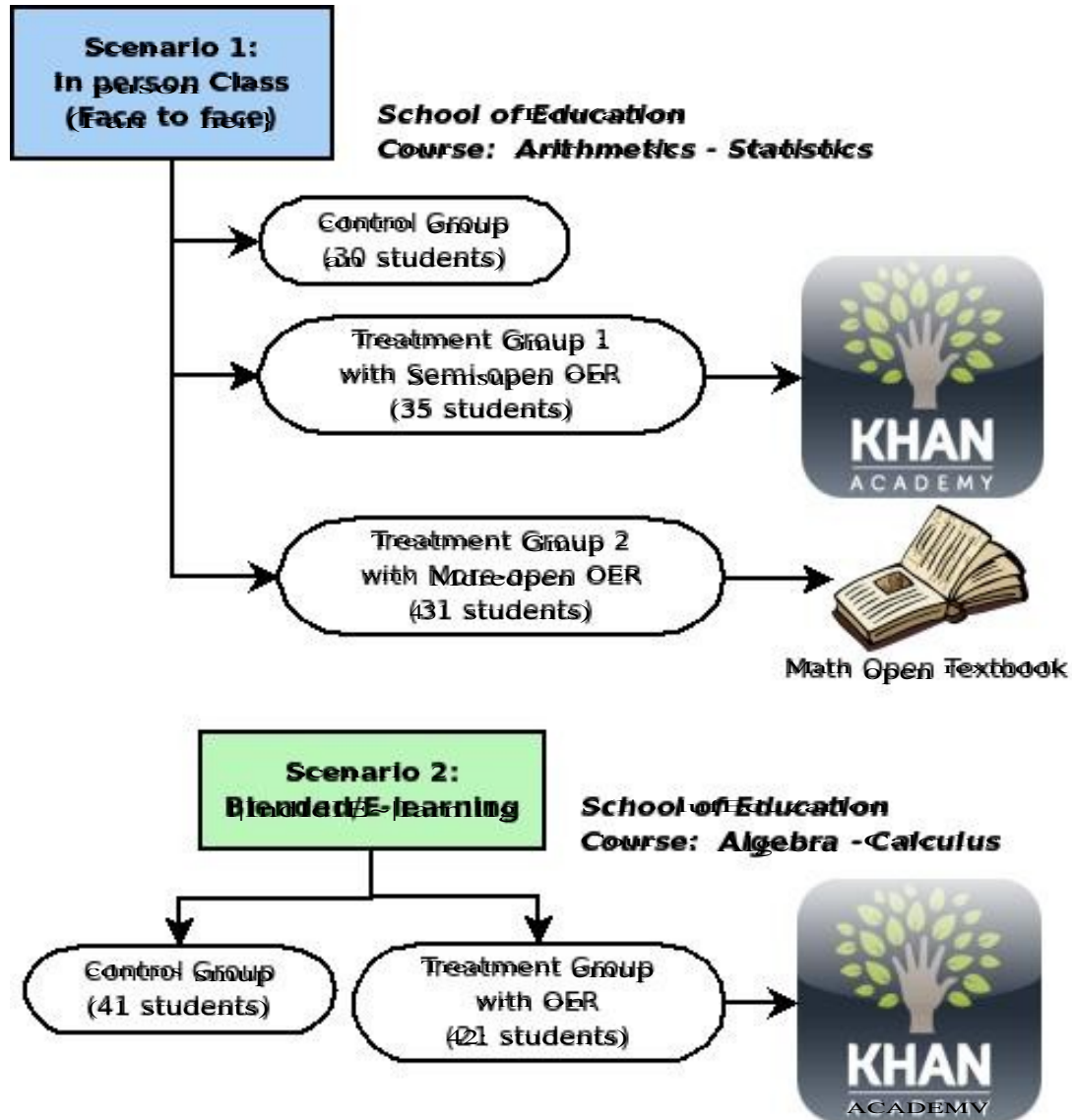# Rationale

- OER Adoption looking to assess its Effectiveness
  - Student 1st year performance
    - Very low socio-demographic profile
  - Very low retention (46%)
  - Lack of basic knowledge and academic skills
    - No prerequisite to enroll
- Mixed approach
  - Quantitative report, March 2015
  - Qualitative
    - Focus groups with Students / Interview with teachers
    - Survey to students

Scenarios

Scenario 1:
In person Class
(Face to face)

School of Education
Course: Arithmetics - Statistics

Control Group
(30 students)

Treatment Group 1
with Semi-open OER
(35 students)

Treatment Group 2
with More-open OER
(31 students)

KHAN ACADEMY

Math Open Textbook

Scenario 2:
Blended/E-learning

School of Education
Course: Algebra - Calculus

Control Group
(41 students)

Treatment Group
with OER
(21 students)

KHAN ACADEMY

Treatment

- Comparison of groups:
  - randomly assign students to the groups
  - same teacher for all groups in each scenario
  - alternatives to assure comparison
    - **Propensity Score Matching**: estimation of the probability of receiving an specific treatment
  - mechanism of comparison
    - **Inverse Probability Weight**: matching algorithm compare results of most similar individuals

Treatment

- Result variables: dependent
  - Student's results in the final exam of the evaluated course
  - Student's grades in the evaluated course
  - Percentage of student's attendance
  - Percentage of student's retention
- Standard deviation

Results: Face-to-face scenario

Table 1: Estimation of the effect of using OER (Khan) versus the use of none additional resources

Attendance	Final Exam	Final Course Score
- 0.90**	0.66**	0.15
(0.23)	(0.29)	(0.30)

*** = p<0.01, ** = p<0.05, * = p<0.1; n: 61.

Table 2: Estimation of the effect of using OER (Khan) versus the use of none additional resources using PSM

Attendance	Final Exam	Final Course Score
-0.86**	0.54*	0.13
(0.36)	(0.30)	(0.33)

*** = p<0.01, ** = p<0.05, * = p<0.1; n: 32.

Results: Face-to-face scenario

Table 3: Estimation of the effect of using Khan versus the use of an Open Textbook

Attendance	Final Exam	Final Course Sm-v
- 1.38***	1.49***	0.21
(0.21)	(0.13)	(0.25)

*** = p<0.01, ** = p<0.05, * = p<0.1; n: 65.

Table 4: Estimation of the effect of using Khan versus the use of an Open Textbook using PSM

Attendance	Final Exam	Final Cwrsesm-v
-1.24***	1.55***	0.28
(0.15)	(0.10)	(0.24)

*** = p<0.01, ** = p<0.05, * = p<0.1; n: 55.

Results: e-Learning scenario

Table 6: Estimation of the effect of using OER[8]

Final Exam	Final Course Score
- 0.22	0.12
(0.30)	(0.31)

*** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$; n: 61.

Table 7: Estimation of the effect of using OER using PSM

Final Exam	Final Course Score
0.26	0.04
(0.29)	(0.28)

*** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$; n: 32.

Conclusions

- students of the face to face classes that used a **semi-open OER** obtain significantly **better exam grades** than students:
  - that did not use any extra resource
  - that used an open textbook as an extra resource
- face-to-face students that used semi open OER have significantly **less attendance** levels than other examined students

Thanks for your attention!!!

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