Aug 18, 2023

My earth-EVAL pilot

DOI
dx.doi.org/10.17504/protocols.io.yxmvm24jbg3p/v1

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OPEN ACCESS

DOI: https://dx.doi.org/10.17504/protocols.io.yxmvm24jbg3p/v1

Protocol Citation: Claudia Teran-Escobar 2023. My earth-EVAL pilot. **protocols.io** **https://dx.doi.org/10.17504/protocols.io.yxmvm24jbg3p/v1**

Manuscript citation:
Teran-Escobar, C., Becu, N., Champollion, N., Gratiot, N., Hingray, B., Panthou, G., & Ruin, I. (2023). A pilot randomised controlled trial comparing the effectiveness of the MaTerre180' participatory tool including a serious game versus an intervention including carbon footprint awareness-raising on low-carbon behaviours among academia members in France. PsyArχiv. https://doi.org/10.31234/osf.io/rj4xf

Protocol status: In development
We are still developing and optimizing this protocol

Created: April 14, 2023

Last Modified: August 18, 2023

Protocol Integer ID: 80512

Keywords: earth eval pilot study, awareness about climate change, climate change, pilot study, facilitator, scientific community, intervention, private research organisation, fidelity of the intervention, greenhouse, carbon footprint assessment, participant, earth, research, members of the scientific community, responsiveness of participant, collective effort, ecological transition, raising awareness, assessment, carbon footprint, study, important source of greenhouse, session of intervention, hour group discussion, academic practice, eval pilot background, controlled trial, online survey, online questionnaire, control group, behaviour, impact

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Abstract

Background. Certain activities embedded in academic culture (international conferences, field missions) are an important source of greenhouse. Although some institutions and members of the scientific community have started to propose ways to reduce the impact of Academia, collective efforts should be pursued. Serious games have been used in the past to promote ecological transition. Nevertheless, to our knowledge, the deployed evaluations have only measured the changes on knowledge and not on behaviour. The main objectives of this study are to 1) Evaluate the feasibility of two interventions and, 2) Evaluate the fidelity of the interventions provided to the experimental and control groups.
Methods. People employed by a French public or private research organisation (N=30) will be recruited and randomised to one of the two arms. The experimental arm consists in a 1-hour group discussion for raising awareness about climate change, carrying out a carbon footprint assessment and participating to a serious game called “My earth in 180 minutes.” The control arm consists in a 1-hour group discussion for raising awareness about climate change, carrying out a carbon footprint assessment. During two-time measurements spread out over one month, participants will fill up online surveys about their behaviours, psychological constructs related to behaviour change, sociodemographic and institutional information. For session of intervention, the facilitators will fill up information about task completion, perceived complexity of the tasks, percentage of completion of online questionnaires, duration of each session and perceived responsiveness of participants. Descriptive statistics will be done to analyse percentages and averages of the different outcomes.
Discussion. My-earth EVAL pilot study is a 1-month and a half pilot randomised controlled trial aiming to evaluate the feasibility and the fidelity of a 24-month randomised controlled trial aiming to change academic practices such as professional mobility by air, daily commuting and digital and material purchases.

Troubleshooting

Study Description

1 Common practices in academia such as participating in in-person scientific conferences and field missions are an important source of greenhouse gases and inequalities (Leochico et al., 2021). My earth-EVAL pilot is a study is carried out by a consortium of researchers in social psychology, human geography and climate science aiming to study the feasibility and the fidelity of a pilot randomised controlled trial aiming to change Academia's practices.

The objectives of My earth-EVAL pilot are:
a)Evaluate the feasibility of My earth-EVAL if the different elements of the interventions (completion or non-completion of planned tasks, assessment of task complexity, participation rate in intervention sessions) and the evaluation (completion rate of online questionnaires and quality of the responses)
b)Evaluate the fidelity of the interventions provided to experimental a control arms (exposure to the intervention and responsiveness of participants during the intervention sessions)

The investigators hypothesize that My earth-EVAL pilot study is feasible and faithful.
The main criterion will be feasibility of the intervention that will be operationalised as task completion, complexity of the intervention tasks and percentage of participation in the meetings.
The second main criterion will be the feasibility of the evaluation operationalised as completion rate of the online questionnaires and uality of the answers.
Finally, fidelity of the intervention operationalised as exposure to the intervention and perceived responsiveness of the participants.

In the study, the participants will be randomly allocated in an experimental arm or a control arm:

1) The experimental arm will receive a behavioural intervention (a group discussion for raising awareness about climate change, a carbon footprint assessment and a session of the serious game "My earth in 180 minutes")
2) The control arm will receive a shorter behavioural intervention (only a group discussion for raising awareness about climate change and, a carbon footprint assessment)

Detailed Description:
Sample size :

Because our data analysis will be descriptive as a part of the feasibility study, we consider that a power analysis is not necessary (Whitehead et al., 2014). Considering time and resources constraints, we decided to recruit thirty participants (*N* = 30) that will be randomised in the experimental or control arm.

Study Design

2 **Study type:** Interventional (Control trial)
Estimated enrollment: 30 participants
Allocation: Randomised
Intervention Model: Parallel Assignment
Masking: Not masking
Masking description: Concerning blinding, blinding not possible because the programme implementers deliver different content in the mail and during the collaborative workshops.
Primary Purpose: Testing feasibility and fidelity
Official Title: My earth-EVAL pilot, a study comparing the effectiveness of a collaborative workshop including a serious game versus an intervention including carbon footprint awareness-raising among academia members in France
Actual Study Start Date: December 1, 2023
Estimated Primary Completion Date: June 1, 2024
Estimated Study Completion Date: June 1, 2025

Arms and Interventions

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3.1 **Experimental: My earth in 180 minutes: a serious game intervention**

- One group discussion (between 5 people and a facilitator during one hour) about the energy consumption and the basic human's needs, planetary limits, climate issues, current carbon footprint of a French person and target carbon footprint according to the Paris Agreement, the link between activities in an academic life and carbon footprint, the distribution of the carbon footprint of some laboratories and the initiatives to diminish it. At the end of the meeting, they make an astonishment report using virtual Post-its. The behavioural change techniques (Michie et al., 2013) that were targeted by these activities are "5.2 Salience of consequences", "5.3 Information about social and environmental consequences", "6.3 Information about others' approval" and "4.1 Instruction on how to perform the behaviour".
- Carry out a carbon footprint. This carbon footprint (https://avenirclimatique.org/micmac/simulationCarbone.php) takes between ten and

fifteen minutes and needs precise information about the household energy consumption. The behavioural change technique (Michie et al., 2013) that was targeted by this activity is “2.2 Self-monitoring of behaviour”.

- One game session (between 5 people and a facilitator during two hours and 20 minutes). The group of five participants play the serious game “My earth in 180 minutes” under the gaze of the facilitator who answers questions and indicates the different moments of the game. During the game session, each player takes on the role of two characters from a research laboratory and begins a free negotiation followed by a guided negotiation to reduce the carbon footprint of their research laboratory by 50%. In addition, after the end of the game session, the participants and the facilitator carry a debriefing. The behavioural change techniques (Michie et al., 2013) that was targeted by the serious game and its debriefing are “6.2 Social comparison”, “5.2 Salience des consequences”, “13.2 Framing/reframing”, “6.1 Demonstration of the behaviour”, “4.1 Instruction about how to perform a behavior”, “12.2 Restructuring the social environment”.

3.2 **Control Arm: Awareness raising session and carbon footprint**

- One group discussion (between 5 people and a facilitator during one hour) about the energy consumption and the basic human’s needs, planetary limits, climate issues, current carbon footprint of a French person and target carbon footprint according to the Paris Agreement, the link between activities in an academic life and carbon footprint, the distribution of the carbon footprint of some laboratories and the initiatives to diminish it. At the end of the meeting, they make an astonishment report using virtual Post-its. The behavioural change techniques (Michie et al., 2013) that were targeted by these activities are “5.2 Salience of consequences”, “5.3 Information about social and environmental consequences”, “6.3 Information about others’ approval” and “4.1 Instruction on how to perform the behaviour”.
- Carry out a carbon footprint. This carbon footprint (https://avenirclimatique.org/micmac/simulationCarbone.php) takes between ten and fifteen minutes and needs precise information about the household energy consumption. The behavioural change technique (Michie et al., 2013) that was targeted by this activity is “2.2 Self-monitoring of behaviour”.

Outcome Measures

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4.1 **Primary Outcome Measures**

Feasability of the intervention:

1) Task completion (a checklist of all activities that need to be carried out during the intervention sessions)

2) Complexity of the intervention tasks (a scale of 1 to 3, from easy to difficult)

3) Percentage of participation in the meetings (percentage of people absent or present at the intervention meetings).

Feasability of the evaluation:

1) Completion rate of the online questionnaires (average of the completion of each questionnaire)

2) Quality of the answers (considering the duration of each questionnaire). More precisely, the quality of the answerswill allow us to detect participants who potentially do not take the task seriously enough (i.e., with unrealistic short time on certain tasks) by calculating the Median Absolute Deviation (Leys et al., 2013) to detect outliers on the time spent on the page showing the article and will exclude participants with a Median Absolute Deviation superior to 3.

Fidelity of the intervention:

1) Exposure to the intervention (average time of each session)

2) Responsiveness of the participants (via a scale of 1 to 7 from not at all responsive to very responsive, this question will be asked to each facilitator)

4.2 **Secondary Outcome Measures**

Academia's practices:

1) Number of professional trips by air

2) Percentage of home-to-work trips made by car and by active and sustainable mobility

3) Frequency of purchasing of equipment

4) Frequency using of alternatives to air travel

5) Intention towards changing professional trips made by car, reducing home-to-work trips made by car and frequency of purchasing of equipment (Godin, 2012)

Psychological constructs related to changing Academia's practices:

1) Knowledge about climate change (measured through a multiple-choice questionnaire)

2) Beliefs about the consequences of behaviour on the climate (Whitmarsh et al., 2020)

3) Self-efficacy of choosing an alternative to air travel (Godin, 2012)

4) Self-efficacy of choosing an alternative to car travel (Godin, 2012)

5) Self-efficacy of making sustainable purchases (Godin, 2012)

6) Beliefs about negative consequences of reducing air travel (Labo1point5, 2021)

7) Attitudes towards alternatives to air travel (Godin, 2012)

8) Attitudes towards alternatives to car travel (Godin, 2012)

9) Environmental attitudes (Schleyer-Lindenmann et al., 2016)

10) Ecological identity (Lalot et al., 2019)

11) Business travel habits by air (Gardner et al., 2012)

12) Commuting habits by car (Gardner et al., 2012)

13) Compensatory beliefs (Whitmarsh et al., 2020)

14) Perceived self-control resources (Ryan & Frederick, 1997)

15) Descriptive and subjective norms (Godin, 2012)

Socio-demographic information:

1) Gender
2) Age
3) Number of children
4) Self-reported distance between home and work
5) perceived accessibility by train or alternative transport modes
6) Income levels
7) Career status

Institutional information:
1) Employer characteristics
2) Perceived academic recognition
3) Funding for professional mobility (source and budget)

Eligibility Criteria

5 Ages Eligible for Study: 18 Years and older
Sexes Eligible for Study: All

5.1 **Inclusion Criteria:**
- Being over 18 years old
- Being employed by a French public or private research organisation

5.2 **Exclusion Criteria:**
- Being under 18 years old
- Not being employed by a French public or private research organisation

Contacts and Location

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6.1 **Location**
France
Univ. Grenoble-Alpes
Saint-Martin-d'Hères, Rhône-Alpes, France, 38400

6.2 **Sponsors and Collaborators**
Nicolas Becu
Nicolas Champollion
Nicolas Gratiot
Benoit Hingray
Géremy Panthou

Isabelle Ruin
Univ. Grenoble-Alpes
Institut de Recherche pour le développement (IRD)

6.3 **Investigators**

Study Directors: Isabelle Ruin, Researcher, Institut des Géosciences de l'Environnement, Univ. Grenoble-Alpes
Nicolas Becu, Research director, Laboratory Littoral, environnement et sociétés, Université de la Rochelle

More information

7 **Responsible Party:** Isabelle Ruin, Researcher, Univ. Grenoble-Alpes

Individual Participant Data (IPD) Sharing Statement:
Supporting materials:
Study Protocol
Statistical Analysis Plan (SAP)
Informed Consent Form (ICF)
Clinical Study Report (CSR)
Analytic Code
Time Frame: Study Protocole and informed consent form will be available in 2023, the clinical study report and the analytic code will be available after the end of the study (in 2024 or 2025)
Access Criteria: Study protocole preprint, informed consent form, clinical study report preprint and analytic code will be available on OSF platform for everybody
URL: https://doi.org/10.17605/OSF.IO/CHPFK