Choice-based Personalization in MOOCs: Impact on Activity and Perceived Value

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Ilana Ram[1], Sara Harris[2], and Ido Roll[1]

[1] Faculty of Education in Science and Technology, Technion – Israel Institute of Technology, Haifa, Israel
[2] Earth, Ocean, and Atmospheric Sciences, University of British Columbia

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Personalization and the MOOC context:

Educational personalization: Match education opportunities to learner's needs, interest areas, preferences, activity, or performance.

Choice-based personalization: learners customize instruction based on personal attributes and preferences.

Choice-based personalization can/may: increase intrinsic motivation and interest in learning; increase attention and active engagement in the learning process; increase learning gains.

MOOC context: Diverse learner population ("unknown" learner population); high attrition rates (e.g. 6269 learners started this instance of this MOOC, 1350 accessed the assignments, 219 completed at least 1 assignment)

“Climate Change: The Science”

MOOC offered by UBC through the edX platform*

(https://www.edx.org/course/climate-change-the-science-2)

6 weeks (readings, videos, embedded assessments, external resource activities…)

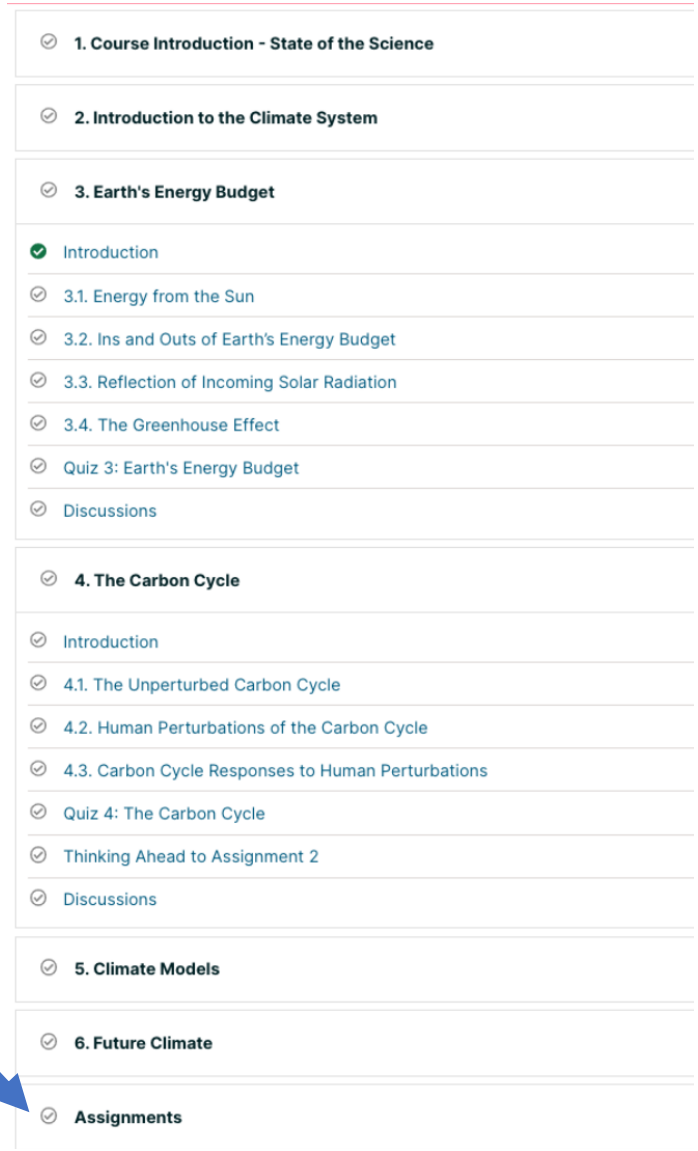
2 essay assignments with peer feedback – the site of this research manipulation

Weekly quizzes

Pre/post surveys

Final exam

* The instance on which this work was based occurred in Fall 2015



Research Questions & Hypotheses

Research Question	Hypotheses
*1. What is the impact of choice-based personalization in a MOOC context on **learners' activity level** in the course?*	**Hypothesis**: Personalization will increase learner activity, as measured by both number of events in the overall course, as well as self-reported time-on-task for the personalized activities.
*2. What is its impact on perceived **learning gains and learning outcomes**?*	**Hypothesis**: Students who receive Personalized instruction will report better learning of local issues; learners in the Generic group will report better understanding of global issues. **Hypothesis**: no difference in final exam between groups, as the manipulation is only a small part of an otherwise identical course.
*3. What is its impact on **perceived value**?*	**Hypothesis**: learners in the Personalized group will attribute greater value to their learning experience as it focuses on climate issues relevant to them.

Research Comparison, in the two essay assignments:

Write a 500–700 word essay about a topic related to climate change…

Personalized Condition*

Assn 1: Write about an example of a climate-change-related impact near where you live. Use 2 references you find yourself.

Assn 2: Write about an example in which carbon is involved in climate change near where you live. Use two references you find yourself.

Generic Condition*

Assn 1: Choose three out of nine provided references and write about the impact of rising sea levels due to climate change based on these references.

Assn 2: Choose three out of nine provided references and write about the relationship between the carbon cycle and climate change based on these references.

Peer evaluation using a marking rubric
Submit your essay to a shared map

* Conditions randomly assigned

Map example

Assignment 1: CLIMATE CHANGE IMPACTS MAP (External resource)

(4.0 points possible)

2 of 2 responses

Student name

UBCx – Climate Change – The Science: Assignment
CLIMATE CHANGE IMPACTS IN MY REGION – WEST AFRICA, NIGERIA
INTRODUCTION:
My location is Nigeria, West Africa, South of the Sahara Desert. Climate Change is now a growing concern in my area because of changing weather & climate patterns, which hitherto were predictable and stable. This has affected agriculture, rainfall pattern, food supply, attendant hunger and insecurity. This essay examines the observed impacts and their likely impacts on the ecosystem and livelihood of the population.
1, Drying Up of Lake Chad
In his recent address to the World Future Energy Summit 2016 in Abu Dhabi, Nigerian President Muhammadu Buhari called for "greater global cooperation against the devastating effects of climate change to avert disaster for the human race in the 21st century". According to him:
"Africa is already suffering from the consequences of climate change, which include recurrent drought and floods. In Nigeria, the drastic drying up of the Lake Chad to just about 10% of its original size, has negatively impacted on the livelihood of millions of people, and contributed in making the region a hot bed of insurgency," (Buhari, 2016)
Nigeria, for the past six years has been battling the Boko Haram insurgency, which has killed thousands and displaced millions. Many sociologists and observers have attributed this insecurity to food insecurity in the Sahel Region caused by desert encroachment and expanding desertification.
Desert encroachment is not only limited to Nigeria; it also affects Niger, Nigeria's northern neighbour at the rate of several hundred meters per annum, which has impacted on the existence of man, animal and vegetation, threatening to alter the whole ecological balance of the sub-region

Measures

Research Question	Measures used to compare two conditions
*1. What is the impact of choice-based personalization in a MOOC context on **learners' activity level** in the course?*	Number of course events* # Assignment submissions Self-reported time on task Essay length
*2. What is its impact on perceived **learning gains and learning outcomes**?*	Self-reports of understanding of local climate issues Self-reports of understanding of global climate issues Exam grades
*3. What is its impact on **perceived value**?*	Self-reports of likelihood to change climate-related habits Self-reports of likelihood to recommend course to a friend

* Events are time-stamped records of the learner's interactions with the course and include, for example, opening pages, closing pages, interactions with videos (play, pause, open transcripts), or interactions with the textbook.

Activity Level Comparisons (mean (SD), N)

Activity measure	Personalized	Generic
Course activity ratio (events after Assn 1/events before Assn 1)*	**2.32 (2.04), N = 99**	**1.76 (1.83), N = 93**
Reported effort on assignment, in minutes	94.06 (56.63), N = 127	91.14 (61.18) N = 146
Word Count	659.98 (250.49) N = 180	682.44.(236.32) N = 181
Submitted Assn 1	N = 99	N = 93
Submitted Assn 2	N = 81	N = 88

* $F(1, 190) = 4.009, p = 0.047, \eta_p^2 = 0.021$

Learning Outcomes Comparisons (mean (SD), N)

Activity measure	Personalized	Generic
Survey: Feeling informed about local climate issues**	**2.99 (0.76), N = 72**	**3.40 (0.66), N = 73**
Survey: Feeling informed about global climate issues	3.82 (0.45), N = 72	3.76 (0.52) N = 74
Final exam score	76.94 (23.64) N = 90	76.50 (24.70) N = 93

** $F(1,142) = 11.59, p < 0.001, \eta_p^2 = 0.075$

NOTE: In the survey, lower numbers = better informed

Perceived Value Comparisons

Activity measure	Personalized	Generic
Survey: Likely to change climate-related habits**	63 out of 73 (86.3%)	48 out of 69 (69.6%)
Survey: Would recommend the course	39 out of 73 (53.4%)	33 out of 69 (47.8%)

** X^2 (1, N = 142) = 5.82, p = 0.016

Summary of Findings

Research Question	Findings
1. Learners' activity level	**Personalized learners did more actions in the course, controlling for pre-manipulation actions.** No difference in % of submissions, assignment length, or time on task.
2. Learning gain and learning outcomes	**Personalized learners reported to have learned more about their locale.** No difference reported in learning about global aspects. No difference in exam grades.
3. Perceived value	**Personalized learners reported that they were more likely to change their behaviours following the course.** No difference in whether they would recommend course to a friend.

Take-aways

- Making learning assignments personally relevant can increase learner connections between content and personal life.
- Benefits of personalization, in this case, are not reflected in learning gains measured with exam-style assessment, but instead are reflected in self-reports.
- Personalization, in this case, did not alter learning gains, as measured by exam-style assessment (personalization was not at the expense of learning broader principles).
- Personalization can increase learners' perceptions of feeling informed.
- Personalization can be achieved efficiently at scale, in a setting with diverse learners, using student choice (without instructor creation/adjustment of personalized instruction for particular learners).