

Should We Give Learners Control Over Item Difficulty?

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What is highlighted?



Argentina



Greenland



Libya

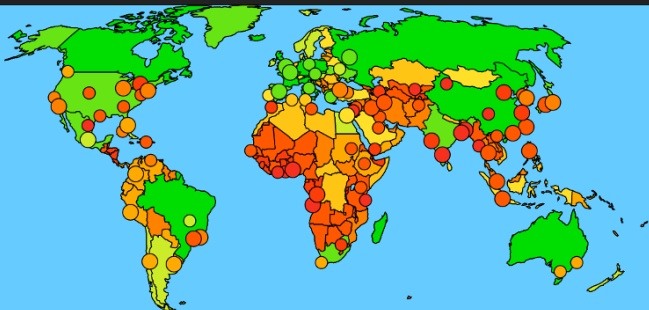
 Don't know

 Continue

World



Feedback



Political map

Practice

Water

Surface

States

Practice

Cities

Practice

Afghanistan	Albania	Algeria	Angola	Argentina	Armenia	Australia
Austria	Azerbaijan	Bahamas	Bangladesh	Belarus	Belgium	Belize
Benin	Bhutan	Bolivia	Bosnia and Herz.	Botswana	Brazil	Brunei
Bulgaria	Burkina Faso	Burundi	Cambodia	Cameroon	Canada	
Central African Rep.	Chad	Chile	China	Colombia	Congo	Costa Rica
Côte d'Ivoire	Croatia	Cuba	Czech Rep.	Dem. Rep. Congo	Dem. Rep. Korea	
Denmark	Djibouti	Dominican Rep.	Ecuador	Egypt	El Salvador	Eq. Guinea
Eritrea	Estonia	Ethiopia	Falkland Is.	Fiji	Finland	France
Gabon	Gambia	Georgia	Germany	Ghana	Greece	Greenland
Guatemala	Guinea	Guinea-Bissau	Guyana	Haiti	Honduras	Hungary

Abidjan	Accra	Addis Ababa	Algiers	Ankara	Athens	Atlanta	Baghdad	Baku
Bangalore	Bangkok	Beijing	Berlin	Bogotá	Brasília	Buenos Aires	Cairo	Cape Town
Caracas	Casablanca	Chengdu	Chicago	Dakar	Damascus	Dar es Salaam	Denver	Dhaka
Hanoi	Havana	Hong Kong	Houston	Istanbul	Jakarta	Johannesburg	Kabul	Khartoum
Kyiv	Kinshasa	Kolkata	Kuwait	Lagos	Lima	Lisbon	London	Los Angeles
Luanda	Madrid	Manila	Melbourne	Mexico City	Miami	Monterrey	Moscow	Mumbai
Nairobi	New York	Osaka	Paris	Pyongyang	Rangoon	Rio de Janeiro	Riyadh	Rome
San Francisco	Sana'a	Santiago	Santa Domingo	Sao Paulo	Seoul	Shanghai	Singapore	Sydney
Taipei	Tashkent	Tehran	Tel Aviv-Yafo	Tokyo	Toronto	Tripoli	Tunis	Urumqi
Vancouver	Vienna	Washington, D.C.						

Questions of Suitable Difficulty

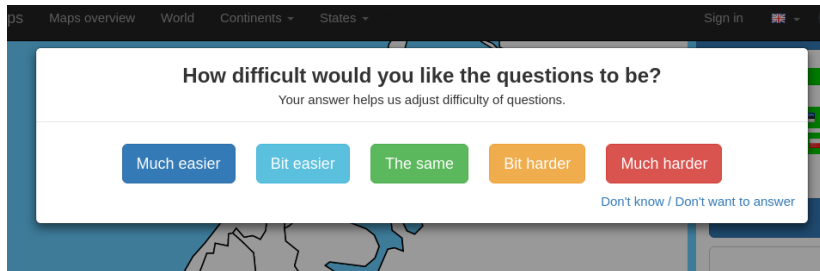
- data on performance \Rightarrow learner modeling \Rightarrow estimate of knowledge
- estimate of knowledge \Rightarrow choice of suitable question
- target difficulty of questions
 - previous experiment
 - best results for 35% error rate

Give learners control over target difficulty.

- research question: is it beneficial?
- specific version of more general problem: giving users control vs automatic decisions
- closely relevant previous experiment: Math Garden, this experiment much larger (millions of answers)

Realization

practice divided into series of 10 questions



The screenshot shows a web application interface with a dark top navigation bar containing links like "Maps overview", "World", "Continents", and "States". A "Sign in" button is on the right. A white modal dialog is centered on the screen with the title "How difficult would you like the questions to be?" and the subtitle "Your answer helps us adjust difficulty of questions." Below the subtitle are five colored buttons: "Much easier" (blue), "Bit easier" (light blue), "The same" (green), "Bit harder" (orange), and "Much harder" (red). At the bottom right of the modal, there is a link that says "Don't know / Don't want to answer". The background of the page shows a map of the world.

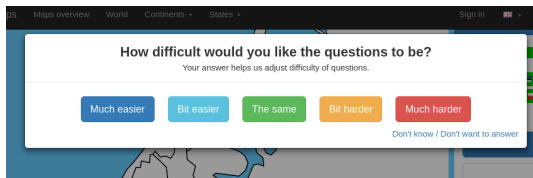
How difficult would you like the questions to be?

Your answer helps us adjust difficulty of questions.

Much easier Bit easier The same Bit harder Much harder

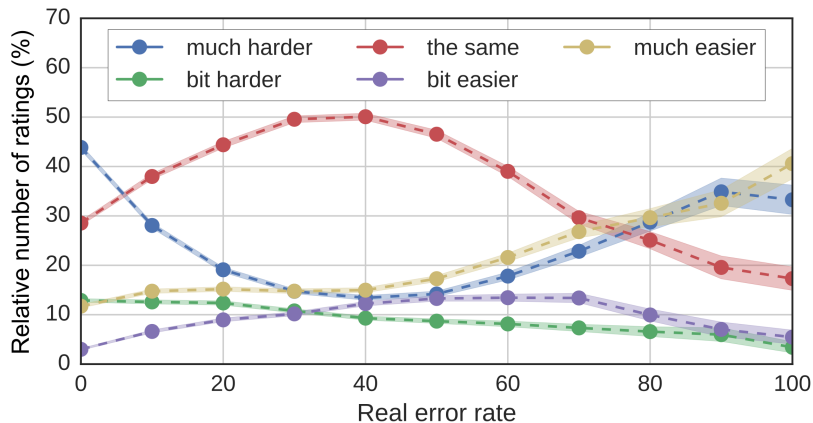
[Don't know / Don't want to answer](#)

Experimental Conditions



- **normal** – no dialog box
- **placebo** – dialog box, without effect
- **adjustment** – dialog box with effect

Ratings

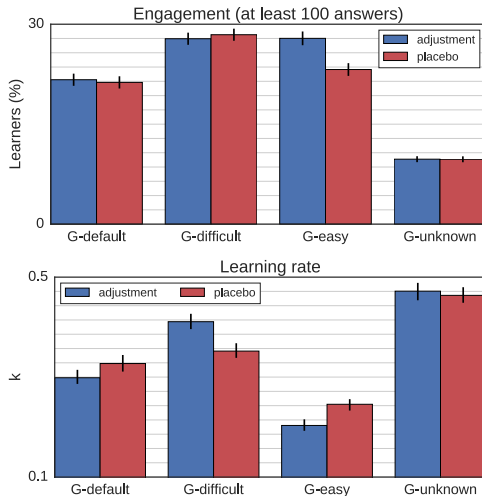


Engagement and Learning

overall results: small differences among conditions

- engagement: dialog box reduces engagement, adjustment not sufficient to overweight this disadvantage
- learning: no significant differences

Disaggregated Results



Summary

- overall: giving learners control over question difficulty not beneficial
- warning for similar research: presence of irony in learners' responses

Issues for Discussion

- circumstances under which it is beneficial to give users control over settings
- specific hypotheses for experiments
- irony in user responses