Designing a World that Teaches Itself

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CHALLENGE & OPPORTUNITY

Design at Large

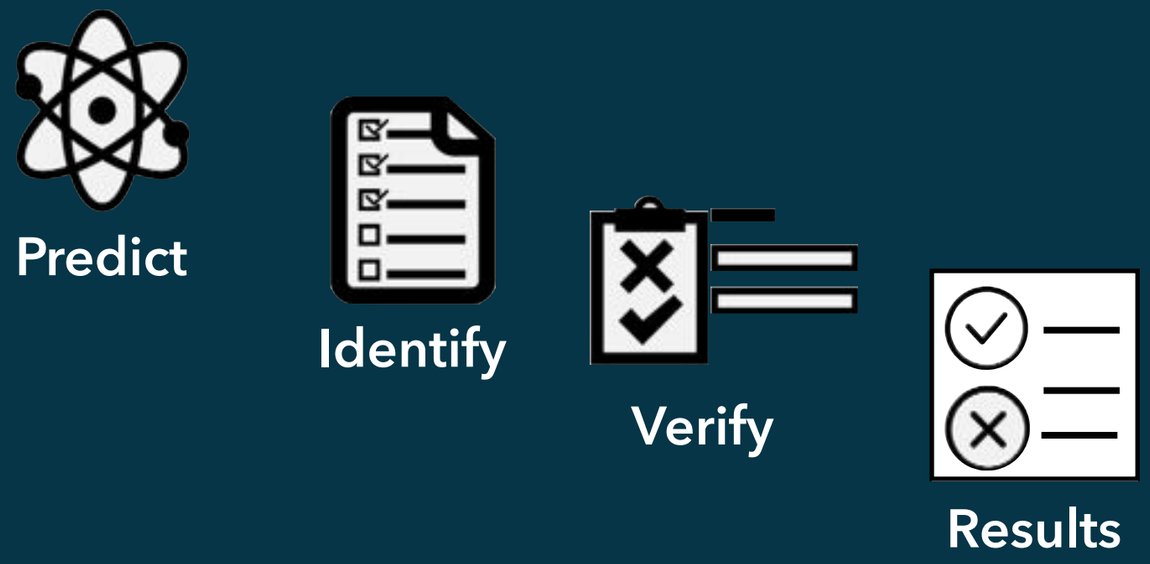

Zappos
Zappos
loft=LOFT

RESEARCH EXAMPLES

peer assessment

small-group discussions

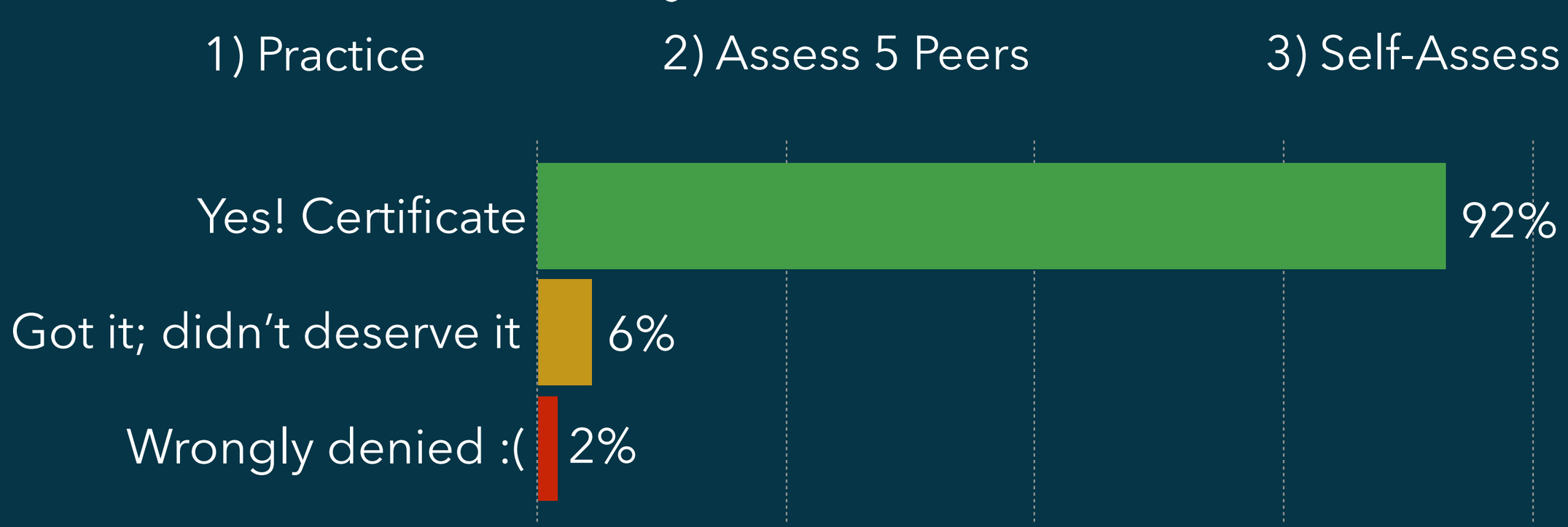
richer feedback



machine+peer learning

AT LARGE...

Peer assessment



Peer and Self Assessment in Massive Online Classes, Kulkarni *et al.*, TOCHI 2013

AT LARGE...

Peer assessment in 100+ classes

Human-computer Interaction

Design

Programming in Python

Code

Introduction to Philosophy

Essays

Teaching character

Management

Child Nutrition

Recipes

Social Psychology

Essays

Constitutional law

Arguments

World Music

Music

Peer and Self Assessment in Massive Online Classes, Kulkarni *et al.*, TOCHI 2013

FORTUNE COOKIES

Qualitative, personalized feedback

- Peers can recognize errors from a list of patterns, even if they can’t articulate them
- Most errors are variations on a theme

+ “...because _____”

Peer and Self Assessment in Massive Online Classes, Kulkarni *et al.*, TOCHI 2013

Alone Together?

LEVERAGING DIVERSE EXPERIENCES

Small groups in massive classes

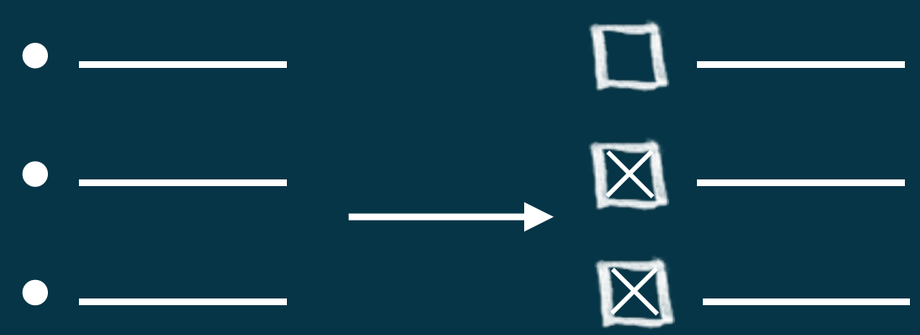
"It was like a mini-UN. We had an Australian currently residing in Dubai, an Afghan, a Romanian, an Indian & myself (a Pakistani)."

Making Distance Matter with Small Groups in Massive Classes, Kulkarni *et al.*, in submission

IDENTIFY-VERIFY

Creating Micro-Experts

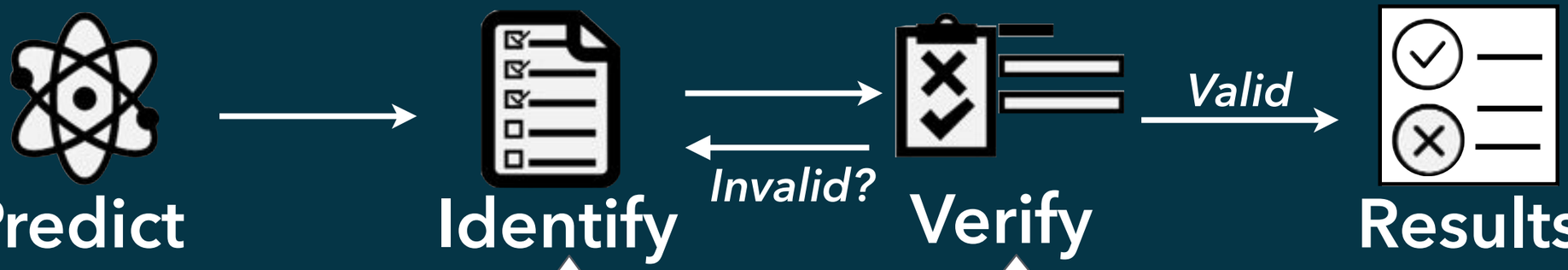
- richer semantics increase quality

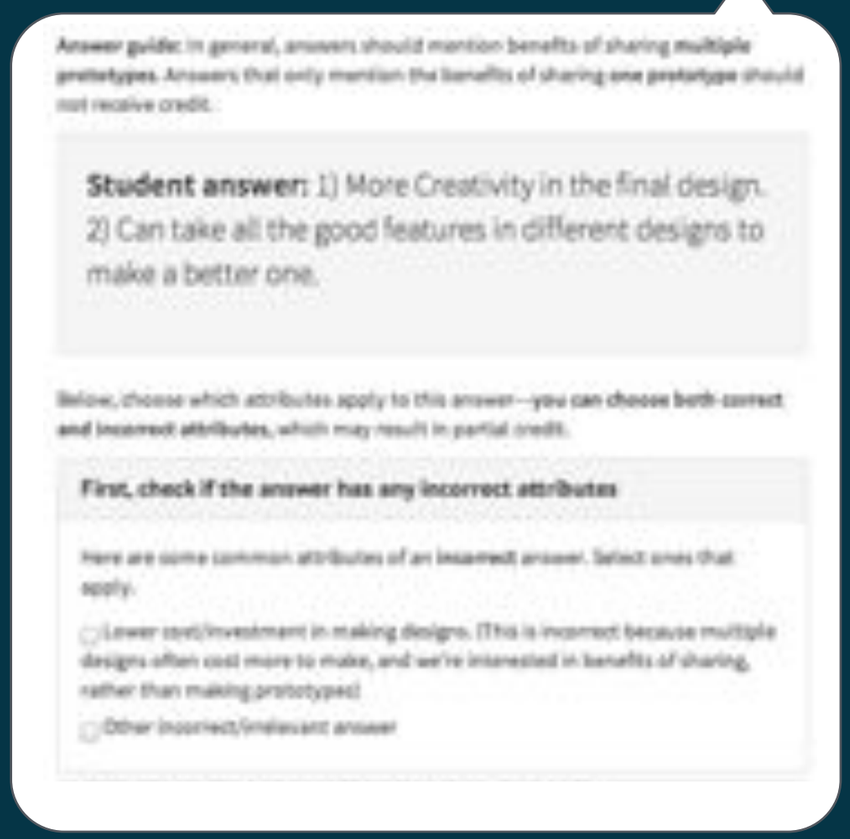


Scaling Short-answer Grading by Combining Peer Assessment with Algorithmic Scoring, Kulkarni, Socher, Bernstein, & Klemmer, Learning at Scale, 2014

IDENTIFY-VERIFY

Machines modulate peer grading





Answer guide: In general, answers should mention benefits of sharing multiple prototypes. Answers that only mention the benefits of sharing one prototype should not receive credit.

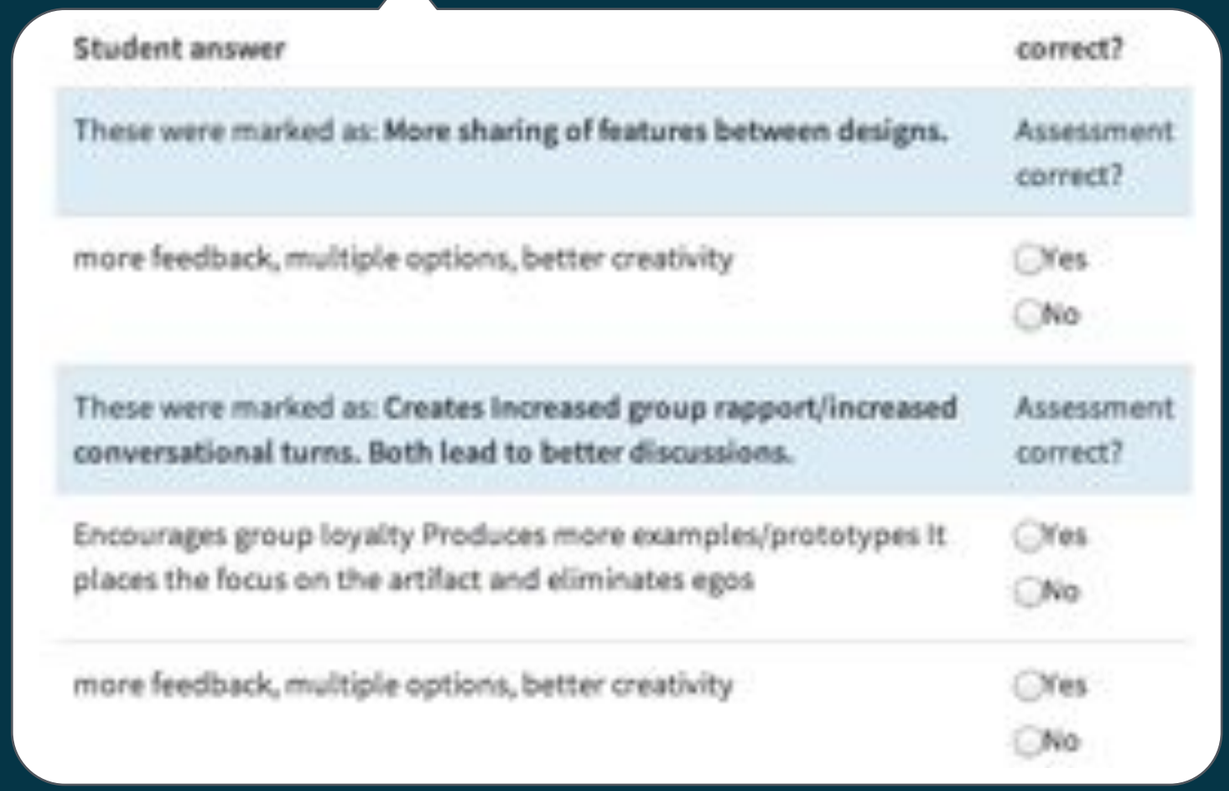
Student answer: 1) More Creativity in the final design. 2) Can take all the good features in different designs to make a better one.

Below, choose which attributes apply to this answer—you can choose both correct and incorrect attributes, which may result in partial credit.

First, check if the answer has any incorrect attributes

Here are some common attributes of an incorrect answer. Select ones that apply.

- Lower cost/investment in making designs. (This is incorrect because multiple designs often cost more to make, and we're interested in benefits of sharing, rather than making prototypes)
- Other incorrect/irrelevant answer



Student answer	correct?
These were marked as: **More sharing of features between designs.**	Assessment correct?
more feedback, multiple options, better creativity	Yes / No
These were marked as: **Creates increased group rapport/increased conversational turns. Both lead to better discussions.**	Assessment correct?
Encourages group loyalty Produces more examples/prototypes It places the focus on the artifact and eliminates egos	Yes / No
more feedback, multiple options, better creativity	Yes / No

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CS RESEARCH OPPORTUNITY

- Build practical theory with real-world experiments
- Bake pedagogy into software that transforms learning

http://d.ucsd.edu/peer

"Nothing is as practical as a good theory"

"The best way to understand something is to try and change it"

–Kurt Lewin

DESIGN AT LARGE

- Build practical theory with real-world experiments
- Bake that theory into software that transforms <X>

Real experiments are critical

We Need to Do These 3 Things

- Insure that learners understand their role in experiments they opt in to
  Good design is key, and nuanced
- Insuring broad research access to conducting experiments, evaluating data, & open science
  Chairs: you have an important role here
- **Few current CS curricula don't teach experimental design. More should.**
  Especially in data/HCI/learning tracks
  http://cs303.stanford.edu

We Have Resources for You

- Open-source platforms with analytics, course materials, instructor resources, & graduating students :)

http://d.ucsd.edu/peer

The Big Research Opportunity

- Tomorrow's online class won't look like today's (I hope)

scale personalized mastery-learning experiences?

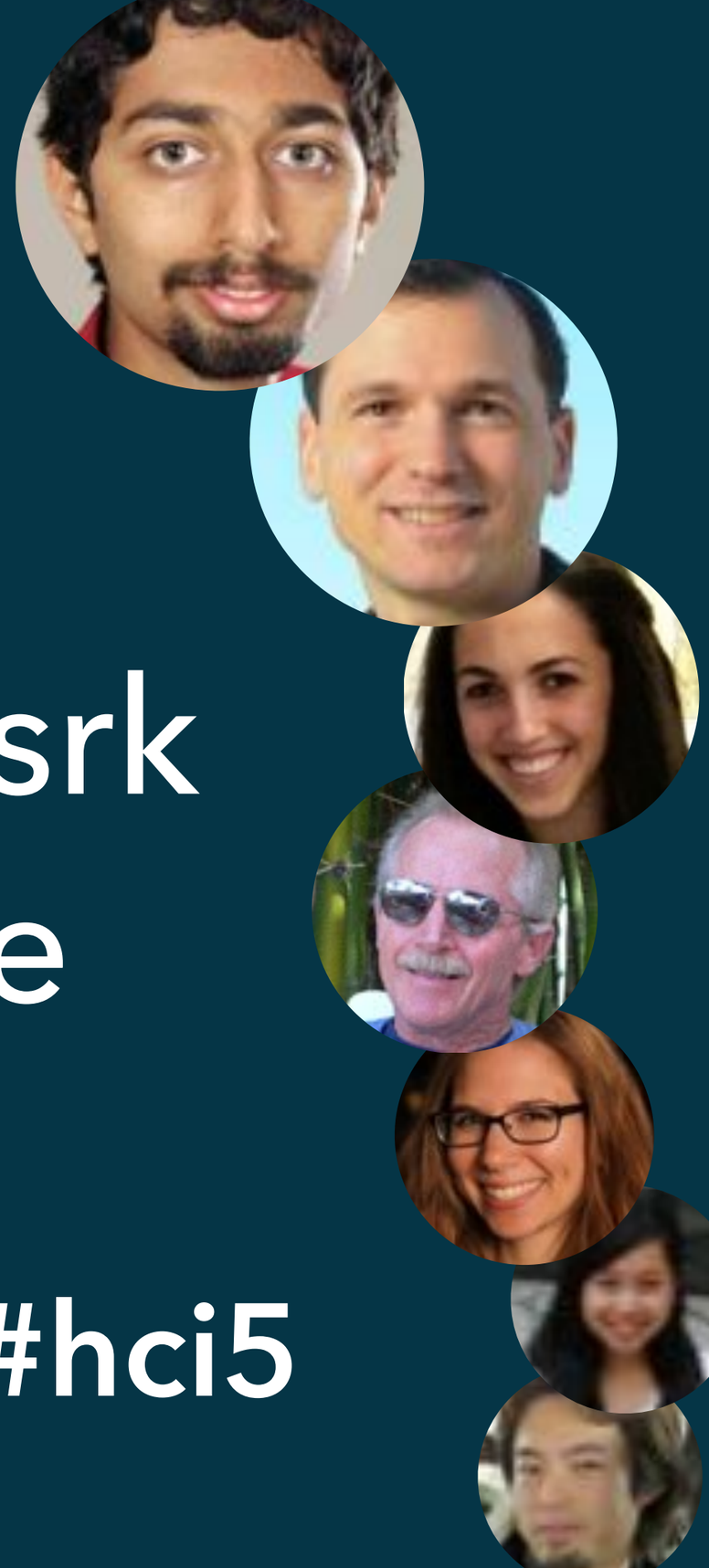
http://d.ucsd.edu/peer

Why CS?

- The scientific opportunities are tremendous
- Concrete problems are a great forge for fundamental insights
- A proud history of lifelong learning
- The CS legacy: don't just understand the world, make it a better place

Fred Brooks, *The Computer Scientist as Toolsmith*

with Chinmay Kulkarni
+ many collaborators



http://d.ucsd.edu/srk

@DesignAtLarge

follow student work at #hci5