



# Human-Computer Interaction

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# Design Methodologies and Methods



72%

## Disruption

Globally, **72 percent of CEOs** believe that the next 3 years will be more critical for their industry than the last 50. CEOs believe it's now or never.

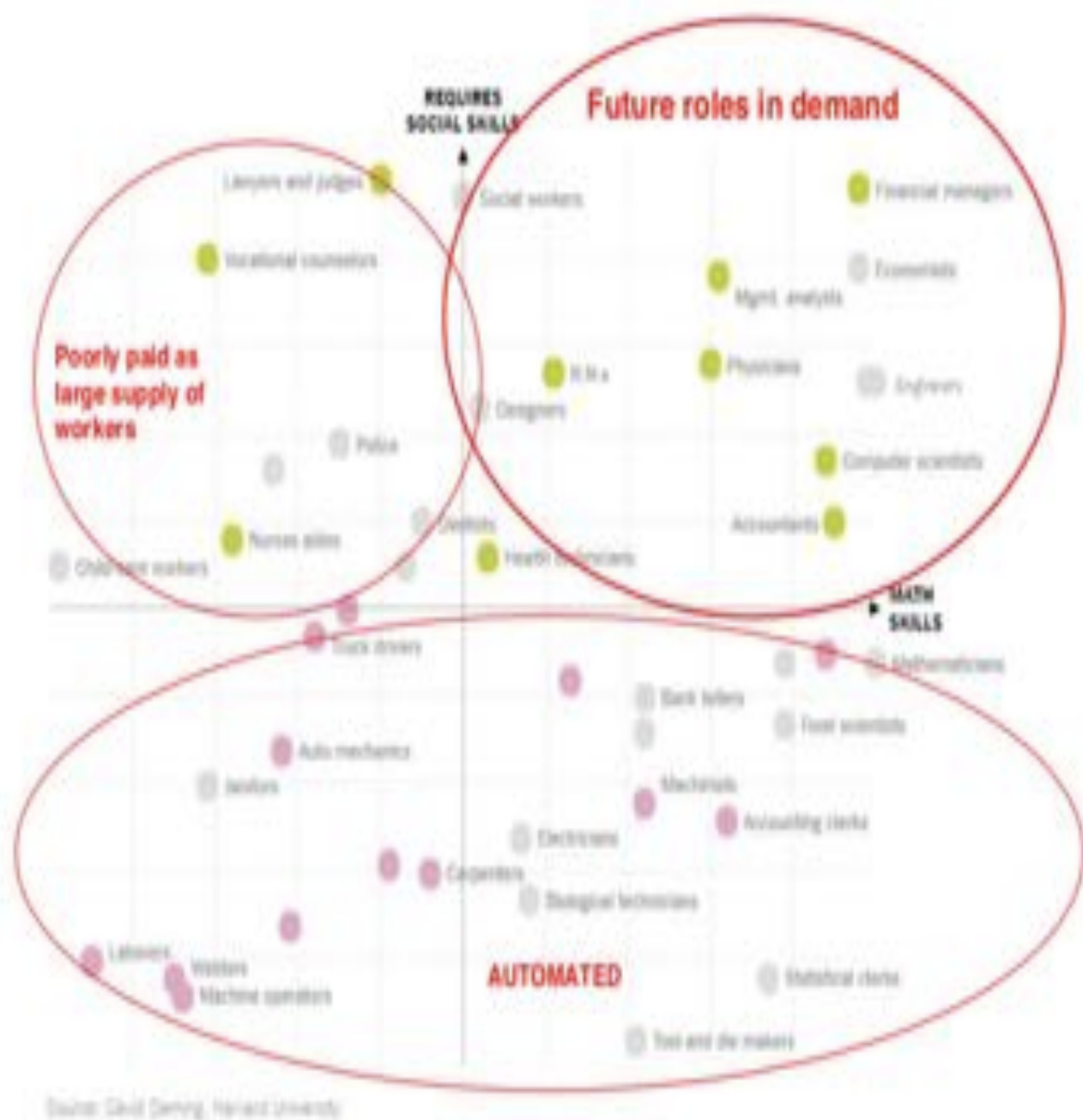


**"The corporate playbook is being rewritten and replaced by one that takes business agility to a level we have never seen before."**

**Lynne Doughtie**  
Chairman and CEO  
KPMG in the US

# Social skills

- In 5 years, 35% of skills considered important in today will have changed.
- Creativity will be one of the top three skills workers will need.
- Emotional intelligence will become the top skills needed by all



# Top 10 skills

## in 2020

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1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgment and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

## in 2015

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1. Complex Problem Solving
2. Coordinating with Others
3. People Management
4. Critical Thinking
5. Negotiation
6. Quality Control
7. Service Orientation
8. Judgment and Decision Making
9. Active Listening
10. Creativity

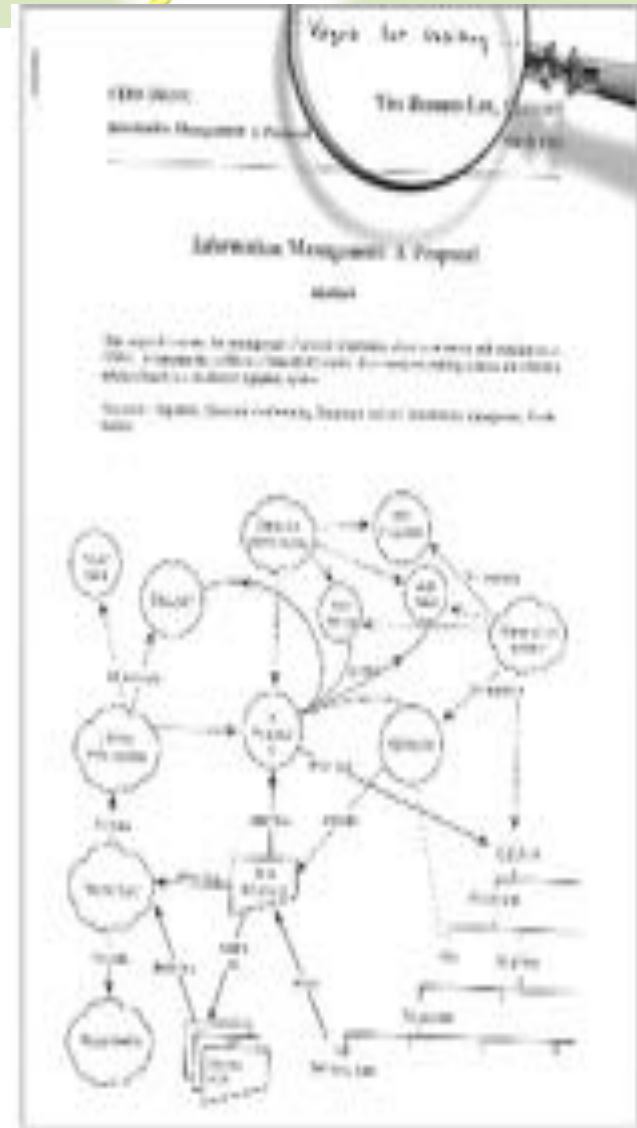
From management of work to

- Team work
- Emotional Intelligence,
- Facilitation



# What if?

“Vague but exciting” –  
what if the comments  
were “Exciting but  
vague”?





# Makers Vs Users (Johnson, R., Shum, V., Rogers, Y., & Marquardt, N., 2016)

To determine whether adding making to the mix enhances learning we tested two conditions. In one condition, young children learned about sensors and processors by building a MakeMe cube from the kit and then carrying out a number of exploratory activities to find out how it works. In the other condition, children were given the cubes ready-made with an explanation and discussion of the components in the cube and then asked to carry out the same exploratory activities... The learning outcomes for the two groups were then compared to test the hypothesis that the children would learn better in the making condition. The findings showed marked differences between the two conditions. We discuss these in terms of the value of *making before doing* versus *starting off by doing*.



- Preparation for Future Learning (PFL) argues that certain activities can prepare students for learning about related subjects in the future... For example, students who spent time preparing for a lecture by analysing data to look for patterns learned more from the lecture than students who spent the same time summarizing a textbook chapter about the same patterns [10]. The literature on PFL suggests that activities that get students to actively engage with a subject before formally learning about it are more effective for preparing students than activities that are more passive.





# Conclusion Summary

- Making is a valuable part of learning, particularly for younger children
- Making encourages collaboration. It is well suited to mixed ability classes
- The way computing technology is presented to children impacts the creative ideas they have

# Developer aims to co-design interface for new eHealth system



# Methodologies

Models/Theories/ Epistemologies	Provides framework/ lenses	Abstract, difficult to relate to reality, need verification and localisation
Survey	Fast, quantitative information	Lack of qualitative interpretation, pre-framed
Ethnography	Inform concepts, values and methods	Interpretations biased
Action Research (Development)	Mutual learning, embrace interventions	Unpredictable (side) effects, Action determined by researcher
Dialogical Approach (Everybody brings their opinion)	Consensus, judgement suspended	Skills needed, difficult to avoid 'your influence' on decisions
Community based	Empowering, familiar, informative for unexpected	Not design oriented, scary for researchers as not 'prepared'



# Method

- Method, a general concept, interpreted as a ‘recipe’ for how to carry out a set of activities – like a cookbook recipe
- Andersen et al. (1990) argue that any description of a coherent method should include the following elements:
  - **Application area**
  - **Perspective (users’ assumptions about technology design)**
  - **Guidelines:**
    - Techniques (how the activities would be carried out)
    - Tools (Instruments)
    - Principles for organisation (decisions i.e who will participate?)



**Ethnography** and **intervention** contrast in terms of their basic approaches and intended results: **ethnographers** originally strove **not to change the phenomena they were studying**, while **interventionists** deliberately **set up activities to change** the organization in order to learn **from the reactions to the change**. However, we have experienced that at a practical level, ***combining the two approaches and iterating between them*** has been an effective way to learn about the organization and also an important resource in generating realistic visions of future use of technology (see e.g. Bødker and Kensing, 1994; Simonsen, 1994; Simonsen and Kensing, 1994; 1996; Kensing, Simonsen, and Bødker, 1996).

# Amazing Indian Children

- Jayakumar, a Class IX student, developed an inexpensive extinguisher that triggers a water motor when it senses heat
  - His mother, a daily labourer at one of Sivakasi's fireworks factories, suffered serious burns during an accident.
- Rourkela, Tejaswani Priyadarshani (14 years old), innovated a bicycle that propels on air. Without pedals or any use of fossil fuels, the "air bike" can run up to 60km on just 10kg of compressed air pumped.
  - She got the idea when she visited a bicycle-repair shop and saw the mechanics using air guns to detangle knots in a bicycle tyre.





Commonalities?



# Commonalities?

- Innovation comes from people **who are given the time to play**
- **Past** as a launching pad to imagine the future
- Explore **many**, many options
- Be part of the **surroundings** and innovate
- Encourage **creative risk-taking**:  
Sandboxing in real life

[https://ideas.ted.com/three-ways-to-help-any-kid-be-more-creative/?](https://ideas.ted.com/three-ways-to-help-any-kid-be-more-creative/?utm_campaign=social&utm_medium=referral&utm_source=facebook.com&utm_content=ideas-blog&utm_term=education)

[utm\\_campaign=social&utm\\_medium=referral&utm\\_source=facebook.com&utm\\_content=ideas-blog&utm\\_term=education](https://ideas.ted.com/three-ways-to-help-any-kid-be-more-creative/?utm_campaign=social&utm_medium=referral&utm_source=facebook.com&utm_content=ideas-blog&utm_term=education)





# Design Approaches

- Empathic Design: a user-centered design approach that pays attention to the user's feelings toward a product
- Biomimicry Design: learning from Nature as model, measure and mentor
- Design Thinking: an approach to creative problem solving; a human-centered path to innovation

## Problem Finding & Solving



## Design & Critical Thinking



## Interviewing & Empathy



## Teamwork & Collaboration



## Building & Prototyping



## Public Speaking & Marketing





# Design Thinking

- Design thinking tackles complex problem by:
  - **Empathising:** Understanding the human needs involved
  - **Defining:** Re-framing and defining the problem in human-centric ways
  - **Ideating:** Creating many ideas in ideation sessions
  - **Prototyping:** Adopting a hands-on approach in prototyping
  - **Testing:** Developing a prototype/solution to the problem



# Empathising



"I feel terrific!"



"I feel terrible!"

# Define

**Goals and Wishes:** what does your partner need to accomplish in the morning?

*\*use verbs*

**Insights:** new learnings about your partner's feelings and motivations. what's something you see about your partner's experience that maybe s/he doesn't see?\*

*\*make inferences from what you heard*



\_\_\_\_\_ partner's name/description

needs a way to \_\_\_\_\_

user's need

because (or "but..." or "Surprisingly...")

*(circle one)*

\_\_\_\_\_ insight

# Ideate



write your problem statement above

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- Braindumping/Brainwriting method: come-up with extremely bad, terrible and stupid idea
- Investigate which attributes of the ideas make them really bad
- Ideas opposite or remove the bad attributes



# Prototype

Sketch your big idea, note details if necessary!





# Test

Make something your partner can interact with!

[not here]

7min

✦ What worked...

✦ What could be improved...

? Questions...

! Ideas...

8min (2 sessions x 4 minutes each)

# DESIGN THINKING: A NON-LINEAR PROCESS

