Thinking tools for infection prevention and patient safety

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infection prevention philosophy

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• introduction to the concept of thinking tools and mental models
• what thinking tools have in common with Swiss army knives and viruses
• why we are bad system thinkers and why we shouldn’t be
• why all of this can help preventing infections and spread of multi-resistant pathogens
“going meta”

“Huston, we have a problem!”
Apollo 13
Preventable proportion of healthcare-associated infections

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>32%</td>
</tr>
<tr>
<td>2003</td>
<td>10-70%</td>
</tr>
<tr>
<td>1999-2006</td>
<td>7-70%</td>
</tr>
</tbody>
</table>


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Daniel C. Dennett

*Intuition pumps and other tools for thinking.* 2013, Norton & Co., NYC

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You can’t do much carpentry with your bare hands and you can’t do much thinking with your bare brain.

Bo Dahlbom
thinking tools

virtual machines = information to treat information

Daniel Dennett
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brains are expectation makers
mining the presence and the past
to anticipate the future

Daniel Dennett

thinking tools
labels
examples
analogies and metaphors
staging
intuition pumps

Daniel Dennett

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hazardous thinking tools

“boom crutches”

Daniel Dennett

Ockham’s razor

Other, more complicated solutions may ultimately prove to provide better predictions, but—in the absence of differences in predictive ability—the fewer assumptions that are made, the better.

Wikipedia

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Ockham’s razor

Other, more complicated solutions may ultimately prove to provide better predictions, but—in the absence of differences in predictive ability—the fewer assumptions that are made, the better.

Ockham’s broom

underexplain a proposition

whisking inconvenient facts out of sight

Douglas Hofstadter
Ockham's broom
underexplain a proposition
whisking inconvenient facts out of sight

Douglas Hofstadter

good remedy: talk to a lay audience

Daniel Dennett

all thinking is interpersonal

Daniel Dennett
JOOTSing -- Jumping Out Of The System

System being as invisible as the air you breath

A dispute with a hidden false assumption

Douglas Hofstadter

preventability
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prevention effectiveness

30% preventable 30% preventable
time
1979 2015

flying behind your aircraft

infectious risk
prevention effectiveness

30% preventable 30% preventable
time
1979 2015

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![Graph showing infectious risk and prevention effectiveness over time from 1979 to 2015.]

- Infectious risk varies over time.
- Prevention effectiveness remains relatively constant.
- 30% preventable in both 1979 and 2015.

- pathogens are invisible
- infections always happen later

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action

result

No hand hygiene

Infectious outcome

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mental models


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ca. 85% of all healthcare-associated infections

Relative importance of specific infectious pathways

Endogenous
Exogenous
Colonisation

Infection
Antibiotic resistance


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Hand Hygiene

Influencing mental models.

Leveraging existing mental models.

Aligning existing mental models.

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Cleanliness

*Copy a story*

Ethical

Unethical

<table>
<thead>
<tr>
<th>Cleansing product</th>
<th>Non cleansing product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dove shower gel</td>
<td>Post-it stickers</td>
</tr>
<tr>
<td>Crest toothpaste</td>
<td>Nantucket Nectar's juice</td>
</tr>
<tr>
<td>Windax cleaner</td>
<td>Energizer batteries</td>
</tr>
<tr>
<td>Lysol</td>
<td>Sony CD pack</td>
</tr>
<tr>
<td>Tide detergent</td>
<td>Snickers bar</td>
</tr>
</tbody>
</table>

Aligning mental models

hospital microbiome

healthcare worker one's view

patient microbiome

computer

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Aligning mental models

transmission!

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No hand hygiene

Infection

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“going meta”

I love fools' experiments. I am always making them.

Charles Darwin
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July 21  (British Teleclass)
TO GLOVE OR NOT TO GLOVE, THAT IS THE QUESTION
Dr. Jennie Wilson, Richard Wells Research Centre, University of West London

July 23  GASTROINTESTINAL ENDOSCOPES: A NEED TO SHIFT FROM
DISINFECTION TO STERILIZATION
Prof. William Rutala, University of North Carolina Medical School

August 13 ASSESSING THE IMPACT OF AN EDUCATIONAL INTERVENTION ON
VENTILATOR-ASSOCIATED PNEUMONIA
Prof. Arti Kapil, All India Institute of Medical Sciences, New Delhi, India

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