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The Human Side of Technology

Bias and its Effect on Human Performance

Disclosure

- I am an employee of Baxa Corporation
- I am a past chairman of the ASHP Section on Pharmacy Informatics and Technology (SOPIT)
- I am an author of the Technology Briefing Paper for the Pharmacy Practice Model Initiative (PPMI) Summit from November, 2010
- The presentation ideas are my own, and do not necessarily reflect policies of ASHP or Baxa.



Objectives

- Describe four human biases and their effect on human performance
- Describe the effect of human biases on the deployment and adoption of technology



The Function of Bias

Survival Value

- Make sense of a continual bombardment of sensory input
- Permit focus and ability to complete tasks
- Permit ability to prioritize work
- Permit management of overwhelming circumstances



Four Biases

1. **Confirmation Bias** – the tendency to filter what we see with our experience
2. **Task Orientation** – the tendency to suspend judgment while performing a rote task
3. **Preference for the Familiar** – the tendency to revert to old behaviors even when we know they are counter-productive
4. **Illusion of Control** – the tendency to engage in ritualistic behavior under the pretense that it controls our environment.



Confirmation Bias

- Our experience becomes a filter by which we judge our perceptions.
- We see what we expect rather than what is actually there
- Fill in the blanks when the information is incomplete or contradictory
- \$h% \$ % 11\$ \$%@ \$h%11\$ by the \$%@ \$h0r%
- Our perceptions change as dictated by our experience



Confirmation Bias

- Human checking is subject to confirmation bias
- IV Safety Summit in 2008 – 10% of all double-checks fail
- Think about implications for managing key databases, like formularies



Task Orientation = Selective Attention

<http://viscog.beckman.illinois.edu/flashmovie/15.php>

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Task Orientation = Selective Attention

- Human beings are capable of selective attention
- Rote tasks are generally unpleasant – we focus on getting them done
- Unless an item in the task is glaringly, obviously wrong, our ability to selectively focus on the task combines with the filter of our expectations to result in a suspension of judgment
- Think about how this affects tasks like editing a 14,000 item drug product database

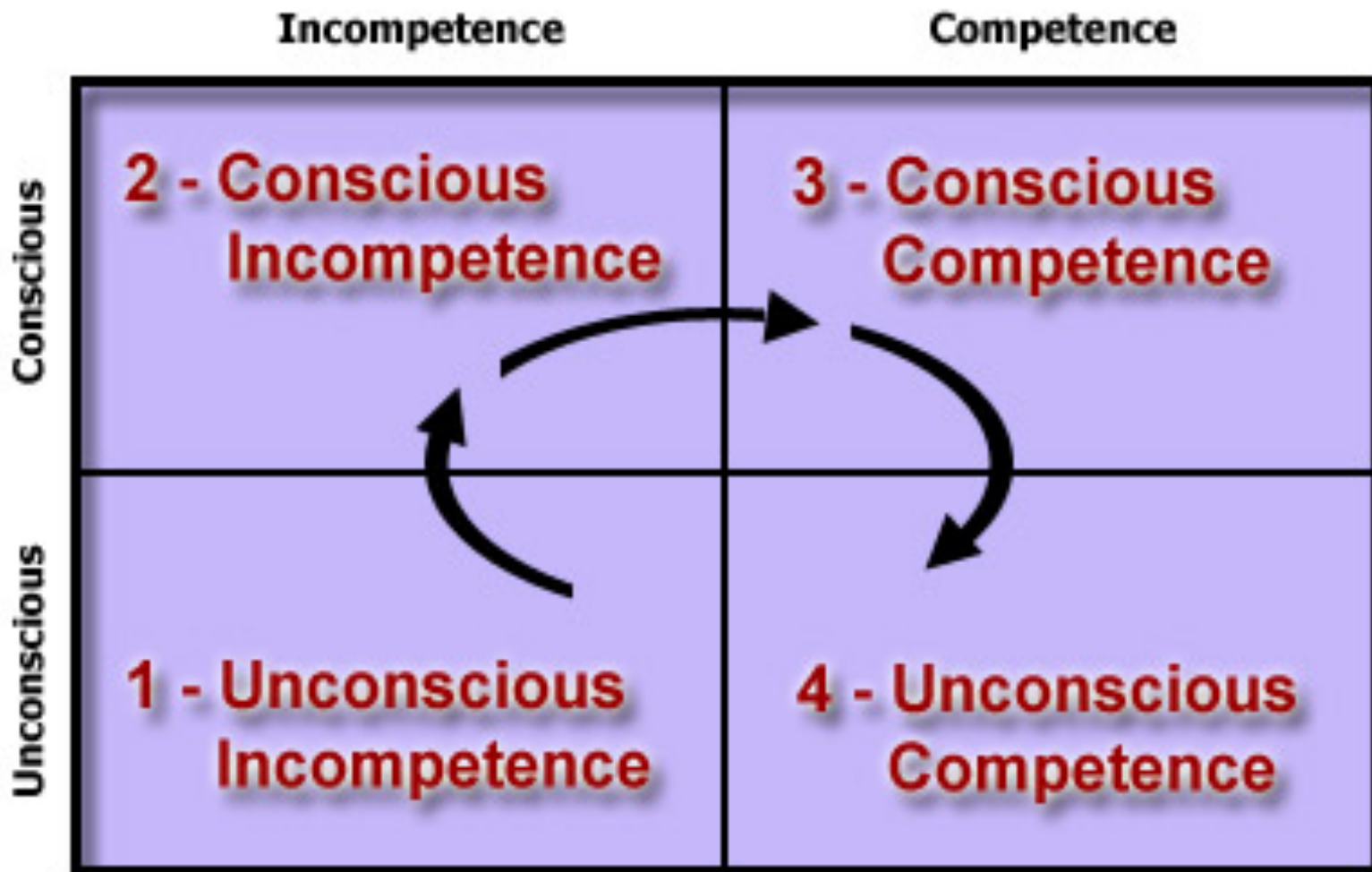


Preference For the Familiar

- We equate competence with habit
- When we have to learn a new way of doing things, we feel incompetent
- Because our competence is a matter of habit, when pressed we will fall back into old behaviors out of habit, even if we know we should not



Preference For the Familiar



Conscious Competence Learning Matrix

Preference For the Familiar

- For some, their sense of competence and mastery of a system is key to their sense of self-worth and/or position in the workplace
- In this case, change in the way work is done affects not only their sense of competence, but their sense of importance and worth



Maintaining the Illusion of Control

- The tendency of people to perform ritualistic behavior with the belief that it influences outcome
 - The gambler and their lucky hat
 - Sports figures and their rituals
- At least I am doing *something!*
- It is our inability to tolerate uncontrollable chaos



Maintaining the Illusion of Control

- In health care, this may take the form of procedures and techniques that cannot possibly affect outcome but are done in the name of “doing something”
- E.g., the illusion that we can be infallible
- Creates difficulties in evaluating the actual necessity of the tasks we do, and what tasks the implementation of automation might actually eliminate.



Technology = Change

Technology SHOULD change the way we work.



Technology = Change

Change for its own sake is not good, but automating current manual functions *rarely* leads to success

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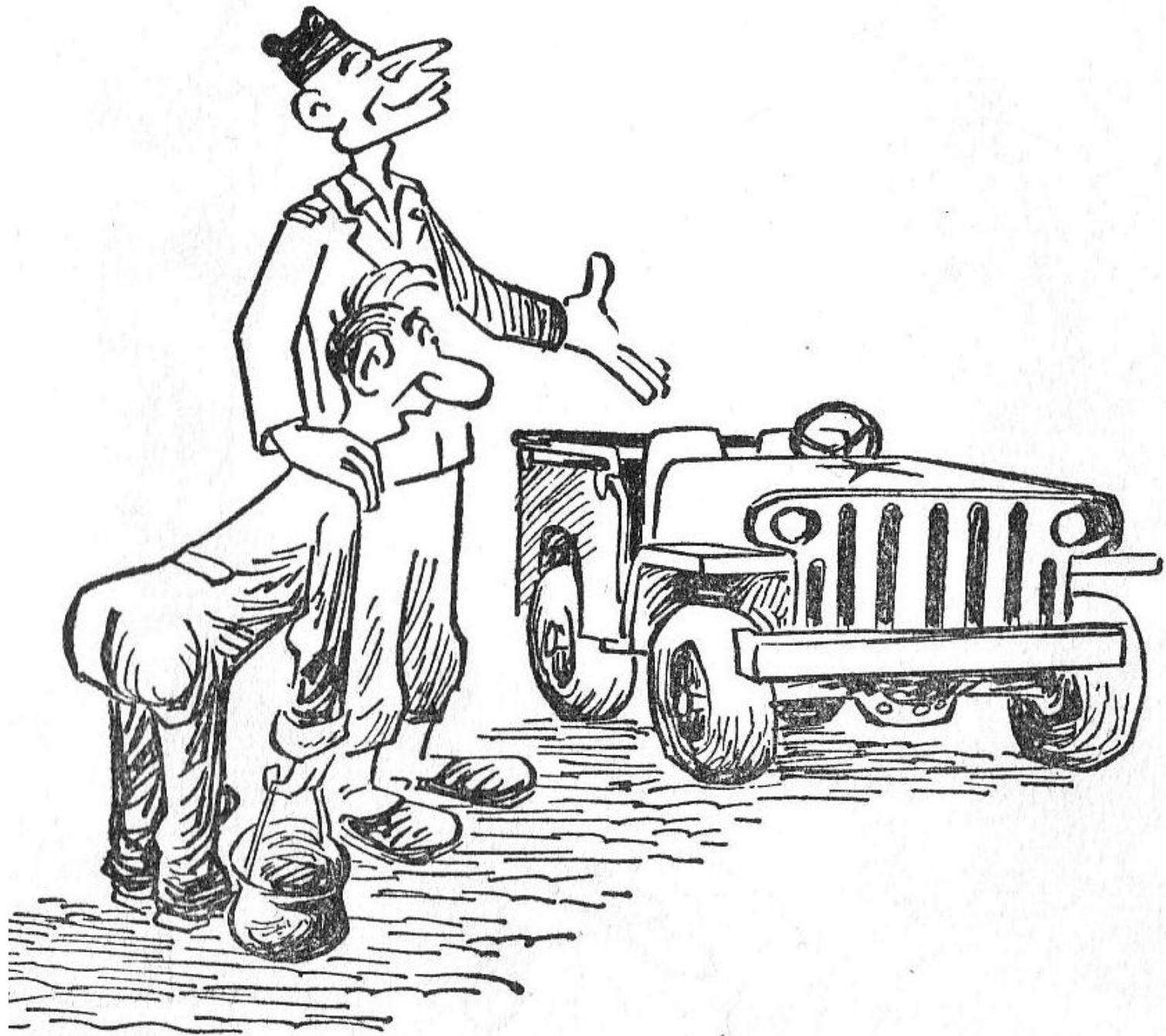


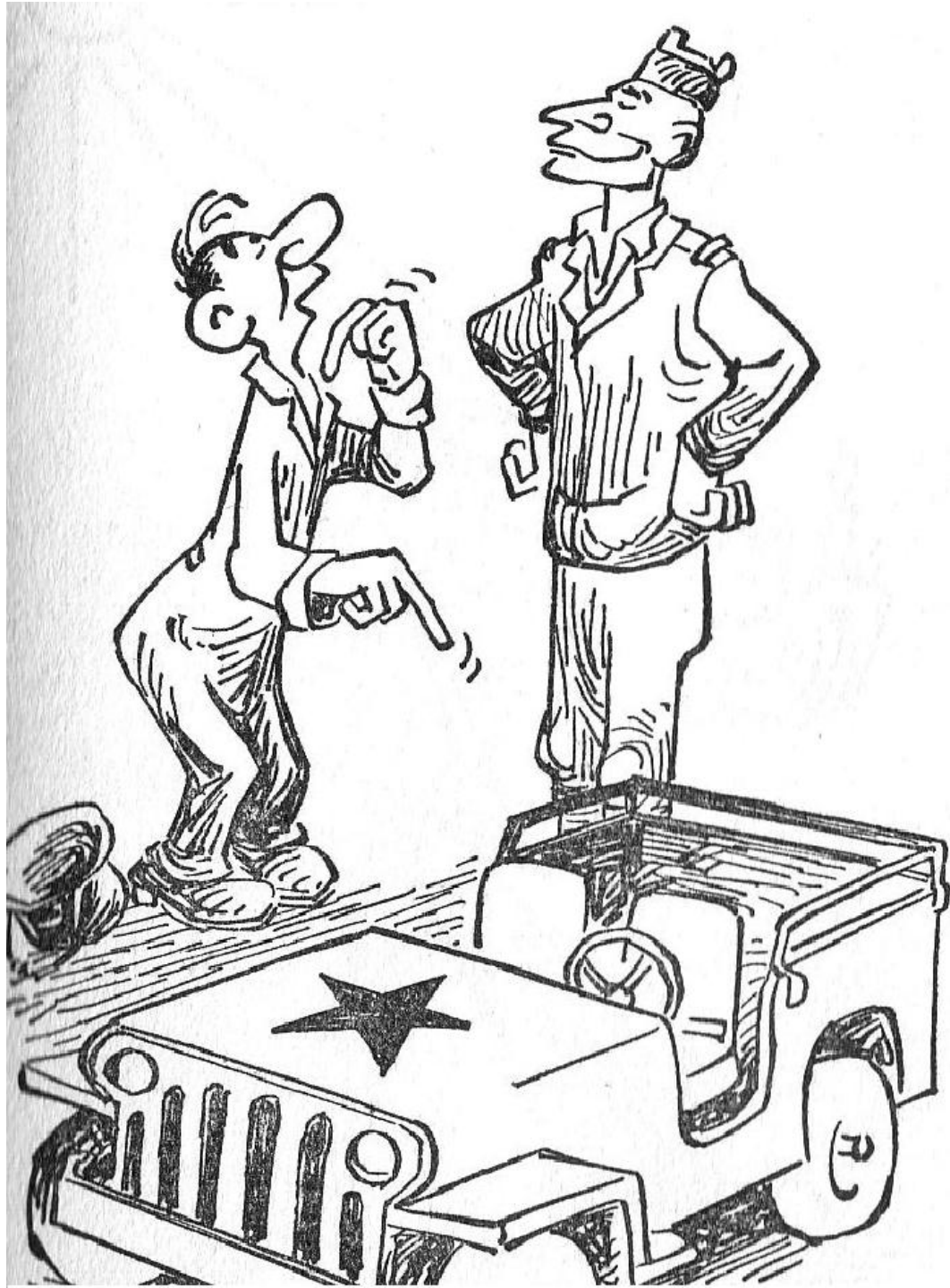


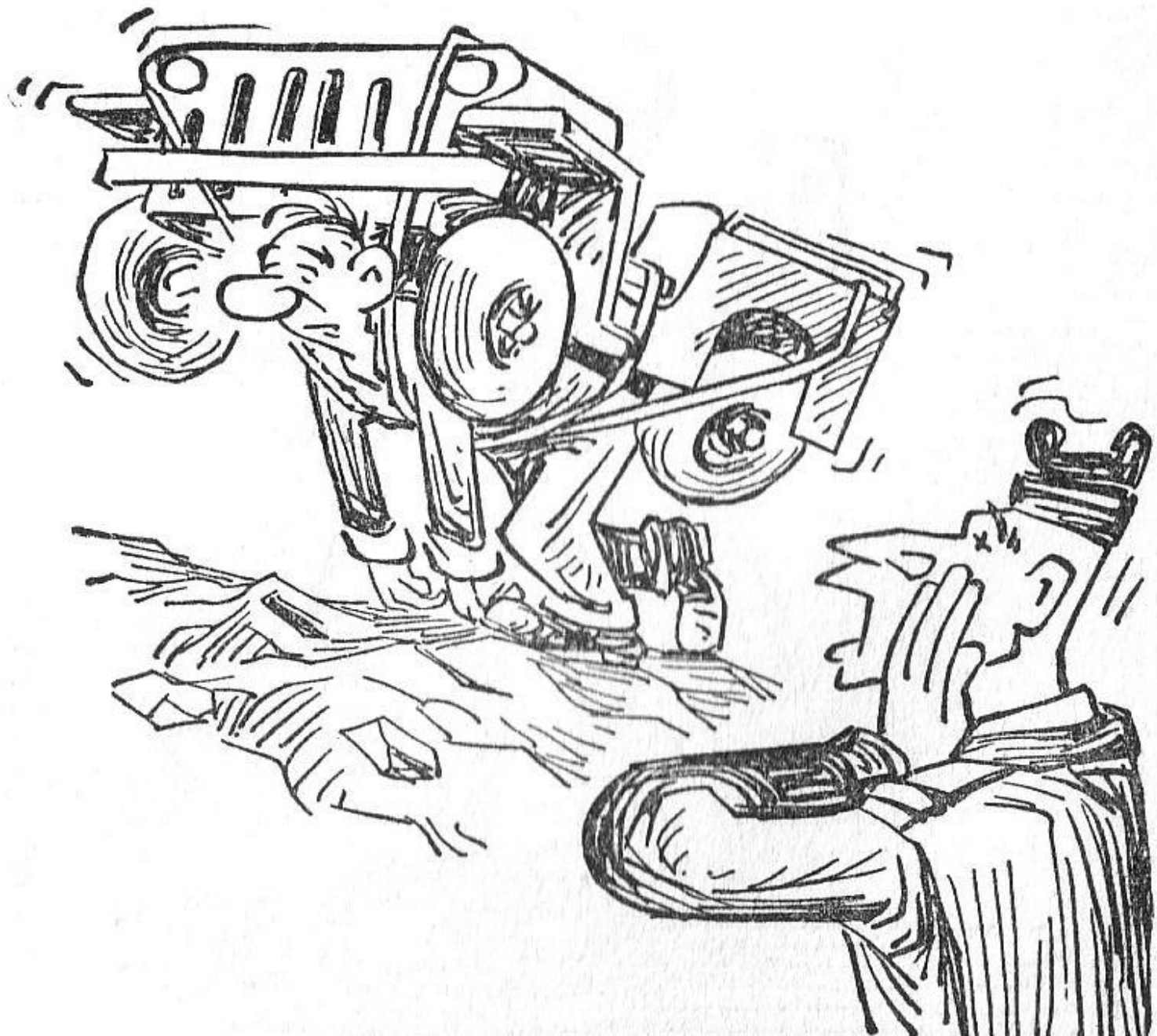






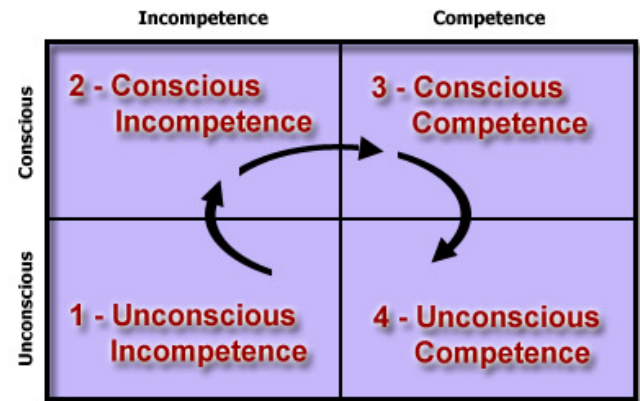






Technology = Change

- The change technology brings creates discomfort
 - Move backward on the Learning Matrix
 - Will take time to learn the new system
 - Will level the playing field among learners
 - Will (and should) challenge dearly held illusions



Conscious Competence Learning Matrix



Technology = Change

- Implementation quality affects adoption
 - Users need to be able to depend on the automation
 - High levels of artifact create the bias that problems are due to the automation, and not to human performance
- Need automated validation steps – human diligence may not be sufficient for large databases



Technology = Change

- Develop current “super-users” as key trainers/advocates in the new systems
- Turnover may be required
- Plan for time to learn and habituate the new work flow
- Expect people to periodically fail
- Work hard at making the system artifact-poor

