look up now and then, a piano is falling from overhead just in case

Richelle Goodrich, 1968-
list design for manual assembly guidelines. as many as you can
Reduce part type
Design parts to be self locating
Consider access and visibility
Consider access and visibility
Design parts to be easy to handle
Design parts to be only installed correctly.
mini quiz

analyze the platen lift assembly
don't look yet!
no sharing. work independently
do as much as you can!

7 minutes
if it's not tested it doesn't work

debugging
if it's not tested it doesn't work
if it’s **not tested** it **doesn’t work**
debugging
debugging

when something goes wrong
stop, observe, and think
don’t jump to conclusions
document the circumstances
debugging

document the circumstances

who observed the problem?
what has been changed?
describe the faulty behavior
what, when, where
debugging

form symptom statements

use an object-defect format

what, when, where
form symptom statements

use an object-defect format

the product made a popping sound,
emitted a flash of light and smoke
form symptom statements
use an object-defect format

the product made a popping sound,
emitted a flash of light and smoke

it shorted out
debugging

build a team to debug

system integrators may facilitate transfer and explain your notes
debugging

make a plan!

- are more experiments needed?
- can the issue be isolated?
- what else needs to happen?
debugging

execute the plan!

- generate hypotheses
- order by likelihood
- start with simple, least invasive
design time!
debugging

5

design and implement

test with mockups
carefully verify
debugging

inform!

summarize the fault (object—defect)

the cause(s), and the solution(s)
debugging
STILL ONE SMALL THING THAT I FEEL THE NEED TO SAY...