CREATIVE THINKING AND PROBLEM SOLVING

DESCRIPTION:

Problem solving has traditionally focused on constraining human behaviors to optimize system performance, but inhibiting behavior has the unwanted side effect of inhibiting creativity and innovation as well. In today's complex and ever-changing environment, stifling creativity and innovation are dangerous strategies. Creative Problem Solving will explore methods for solving problems with creativity while accounting for human limitations and explore reasons that innovation can be challenging. Methods for stimulating new ideas while maintaining order and stability in the laboratory setting will be presented. Cycles of innovation and stabilization, carried forward by inspired staff members, will be key to surviving in the current healthcare environment.

OBJECTIVES:

At the conclusion of this presentation, the participant will:

- Discuss problem solving skills
- Describe methods for creative problem solving
- Apply methods of creative problem solving to the laboratory environment

Creative Thinking and

Problem Solving

Michele Fisher

MT(ASCP) ASQ Certified Six Sigma Green Belt Improvement Specialist III







Apple Computer, Inc.

The ones who are crazy enough to think that they can change the world, are the ones who do

-Steve Jobs





By HikingArtist.com



A problem of quality...

suppression of creativity & innovation

HikingArtist





By Frits Ahlefeldt

I am a surgeon who studies creativity, and I have never had a patient tell me that "I really want you to be creative during surgery" -Charles Limb



quality assurance stabilizing

process improvement disruptive



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Analytical thinking



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Identify the problem

Clarify it

Find the cause



Identify the problem and goal









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Clarify the problem



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"If I had one hour to save the world, I would spend 55 minutes defining the problem and only five minutes finding the solution"

> Dr. Albert Einstein Theoretical physicist 1879 - 1955





UNDERSTAND WHAT ACTUALLY IS...

never accept that the **current reality** is the only reality

understand the magnitude of the problem

don't assume that what you are told about the problem is true

recognize that things change with time

clearly understand what is known and what is not known; eliminate ambiguity

act on what actually is, rather than on what you believe is true

pay attention to things that "don't matter"

Shigeo Shingo



Problem statement

Employees are expected to process between 10 and 15 samples per hour. During the period in which increased errors occurred, the average number a samples processed for all employees on the shift was 7.5 samples per hour.

The employees on this shift are idle.



Problem statement

Kit inventory is 0% accurate electronically, occupies 2 rolling shelves of space, and takes over 4 minutes to retrieve supplies causing supply ordering errors and delays in testing.

Kit inventory is problematic.



Find the cause



By Frits Ahlefeldt



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The Five "Why?"s



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Established path

	Factor	Influence	Ask		
System	Institutional	Economics Cultural Regulatory	Were pressures in the market or new regulatory requirements a factor? Are there other external influences?		
Factors	Organization al Senior Management	Organizational structure Policy standards, communication Safety & risk culture/priorities Finances	Is there a culture that increases non- standardization, poor work or safety habits? Is executive/manager support sufficient?		
	Work Environment	Staffing, skills mix Workload, shift patterns Equipment Administrative/manager support	Does workload correlate with adequate staffing? Was design or adequacy of the environment or operation of equipment a factor?		
	Team/Unit	Communication written & verbal Team leadership Team structure/dynamics	Was communication or lack of information involved (i.e. unclear, too late)? Did interactions influence performance? Is decision support available?		
	Individual	Knowledge, skills, competence Decision making Physical, mental health condition	Were issues of staff training/competency a factor? Is situational awareness a needed skill? Is fatigue or workload a factor?		
	Task	Design and clarity Protocol accessibility Test result accuracy/accessibility	Were appropriate rules/procedures – or the lack thereof a factor? Are instructions clear?		
	Customer/ Patient	Complexity, seriousness of condition Communication barriers Personality and social issues	Was there a lack of understanding with the recipient? Were unclear expectations a factor?		

Adapted from World Health Organization (WHO), 2009

Degree of change

Established Path

Creative Path

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Creativity



Identify Solutions of Value
 Innovation

Putting those ideas into practice

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Laughter



https://youtu.be/bFEvm336Znc



Missing the meaningful



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Enabling creative thinking

- Global Brain Connectivity
- Visualization Training
- Brain Plasticity



Suspending judgment





Creative Thinking

- generate totally new ideas (lateral/linear techniques)
- synthesize from past experiences (intuitive techniques)





"Give me numbers"

"Maybe, maybe not..."



"Elementary, my dear Watson"

"Attennntion!"





"Riddikulus "



"I am delighted with that"



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Creative Thinking Methods (lateral/linear techniques)

- Alternatives
- Change Focus
- Random Entry
- Reversing
- Provocation
- Brainswarming





Generating Alternatives



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Changing Focus



Automated Specimen Tray Tower

- keep bench top clear
- move trays from processing to check-in
- utilize vertical space



Connect With Random Entry

Problem: How can I motivate my team?



Bird... Binoculars Robin Chatter Sounds

Binoculars...How can I motivate my team? Binoculars...Eyes...Glasses...Reimbursement for Glasses Binoculars...Sight...Google glasses...Relaxation rooms Binoculars...Telescope...Observatory nearby...Local field trips



Reversing/Provocation





Brainstorming

- Dominance
- Skeptics
- Idea conformity
- Capturing ideas
- Time consuming

Brainswarming

- Silence
- Independent work
- Hitchhiking/new connections
- Top-down/bottom-up thinkers





RESOURCES

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Creative Thinking Methods

intuitive techniques



Incubation Abstraction Observation Analogy Chunking

By Frits Ahlefeldt

Incubation



Frits Ahlefeldt

Abstraction



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Test Packet Review (TPR)

Test Packet Review (TPR) Process Overview





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TPR Solution 1

Bookmarks guide reviewers through .pdf

(SOP - Charts -Test Directory)

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1	VET	000010310		Component If yes, indic

Test Packet Review Coversheet

Name or Mnemonic: ALA U

Test Number: 0080103

Coversheet standardizes components

NOTE: Management-please use CORP-FORM-7330 to document review comments.

SOP Documents Related to Assay				
Procedure/Process □ Job Aid(s) □ Form(s) □ Appendix				
□ Newer revision of document(s) is pending in collaboration. Released revision(s) is attached.				
□ No SOP included:				
Routed in task or with orderable code/	mnemonic:			
□ Other:				
Example Reports				
Millennium Chart 1	⊠ Connect Chart 1			
Millennium Chart 2	Connect Chart 2			
EPIC Chart I No EPIC chart found				
EELR Chart No EELR chart				
☑ Internal Test Directory (ITD)				
Calculations				
□ Calculation included				
Biennial Calculations under InfoCard nur	nber: ABC-AUDIT-CALC-2020			
No applicable Calculations				
Reference Interval Report				
⊠ Reference Interval Report Included				
□ No Reference Interval Report Included				

Component problems noted? \boxtimes No \square Yes **If yes**, indicate in the DCS Comments section below.



TPR Solution 2

Goal to Simplify $\geq 25\%$ Goal 80% Compliance

66% reduction Avg 6 months 88%

Test Packet Review Guidance List

a de serb en COD is n'et norte d'estite no deste ses accordes et

Test Name(s) & Test Codes:

Role based **LABORATORY SUPERVISORS** quidance Review the SOP, Test Directory, and Example

Review the SOP, Test Directory, and Example Reports. The checklist below can be used as a tool to help guide your review. Notify your department DCS or designee when your section of the checklist is complete. Note that changes just need to be identified and will be addressed *after* Test Packet Review is complete.

Where same info is located / in .pdf (TD & Reports)

	\Box Check when SOP is not routed with packet, see coversneet.						
Tracking what you	Indicate changes needed or not applicable	dicate anges led or not plicable ITD Rep An "X" indicates sh information		Reports icates shared mation	Comments Indicate any changes that will be needed.		
review	Select	PPE – All PPE beyond universal precautions are adequately described.					
	Select	Engineering Controls – Engineering controls used during the procedure are adequately described.					
Definitions added	Select	Specimen – Specimen requirements for performing the test are described and are equivalent to those listed in the test directory. Review: patient preparation; specimen collection, labeling, storage, preservation, transportation, processing, referral; specimen acceptability/ rejection, time limits for additional examinations	x		Place for comments while reviewing		



provided

Observation



To steal ideas from one person is plagiarism.

To steal from many is research.

Wilson Mizner

Frits Alphole Lit





Analogy





Chunking



Chunking

	А	В	С	D	E
1	Standardization	Tracking System	Storage System	Visual Cues	Cycle Counting
				For some reagents,	
				expiration dates are	
				written on a sticky	
				note and fixed to the	Inventory checks and
	Staff know low and	Electronic tracking	Defined storage	outside of the box	communication
2	high inventory limits	system	location (labels)	they are stored in.	between 7/7
				The in use lot of	
				reagent is labeled	
				with a bright pink	
				sticker and stored in	
	Set min/max	Use of new or	dedicated supplies	an area away from	Frequent cycle
3	inventory amounts	expiring lot report	locations	the unvalidated lot.	counting practices
			Risk: in-use lot of		
	SOBs for put away		reagent stored post		
	sors for put away	DTL Signals	te upvalidated let		
4	practices	PIL Signais	to unvalidated lot		
		Risks: not knowing			
		what is coming in			
	dedicated putaway	shipment			
5	individuals	beforehand			

Creative Solutions to Innovation!



By Frits Ahlefeldt

Innovation Blockers



By HikingArtist.com



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Fear of Failure

"What's the worst that could happen?"



Clinging to Order



"The values that people cling to most stubbornly under inappropriate conditions are those that were previously the source of their greatest triumphs."

Jared Diamond, Collapse: How Societies Choose to Fail or Succeed



Cultural Blocks



Environmental Blocks



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Intellectual Blocks



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Holding Your Gains



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Summary

First Step

- Know what you know;
- know what you don't know

Second Step

- Leave the gate open
- Third Step
- Let's roll!





Adams, James L. Conceptual Blockbusting: A Guide to Better Ideas. Cambridge: Basic Books, 2001.

deBono, Edward. Lateral Thinking: Creativity Step by Step. New York: Harper Perennial, 1990.

- Limb, Charles. Your Brain on Improve. <u>http://www.ted.com/talks/charles_limb_your_brain_on_improv.html</u> (accessed August 2021).
- Markman, Art. The Abstraction Method of Problem Solving Adobe 99U. <u>https://99u.adobe.com/author/art-markman</u> (accessed August 2021).
- Merrill, Peter. Innovation Generation: Creating an Innovation Process and an Innovative Culture. Milwaukee, WI: ASQ Quality, 2008.
- Thorpe, Scott. How to Think Like Einstein. Naperville: Sourcebooks, Inc, 2000. e-Book.
- Young, Scott H. Working Memory: A Complete Guide to How Your Brain Processes Information, Thinks and Learns. <u>https://www.scotthyoung.com/blog/2019/04/24/working-memory/</u> (accessed August 2021).
- World Health Organization (WHO). Human Factors in Patient Safety Review of Topics and Tools. <u>https://www.who.int/patientsafety/research/methods_measures/human_factors/hu</u>



