Structured On-the-Job Training Methods and Value
- March 26, 2014 -

Selection of the Media, Methods and Job Aides to Enhance Training Effectiveness and Retention

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  - Engineering Management Program Coordinator
  - Eastern Michigan University
- B.S., Industrial Engineering 1981
  - Iowa State University
- M.S., Engineering Management 1990
  - Western Michigan University
- Ph.D., Industrial Engineering 2010
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Work Experience

- Goodyear Atomic – Plant Startup `81 -`85
- Haworth Inc. – Office Furniture `85 -`05
- RDI, Management/Lean Consultant `05 -`09
- University of Minnesota – Duluth `10 -`11
  - Assistant Professor – Mech. & Ind. Engineering

Presentation Focus

- Value of Structured On-the-Job Training (S-OJT)
- Who we are training and how they learn
- Effectiveness of S-OJT methods and job-aides
- Project plan to study OJT factor effects on training effectiveness and retention

Automotive, Manufacturing and Wage Growth

DETROIT AREA
U.S. BUREAU OF LABOR STATISTICS

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Detroit Area - Economic Summary

Detroit Area
Economic Summary

BLS
U.S. BUREAU OF LABOR STATISTICS

Updated February 05, 2014 www.bls.gov

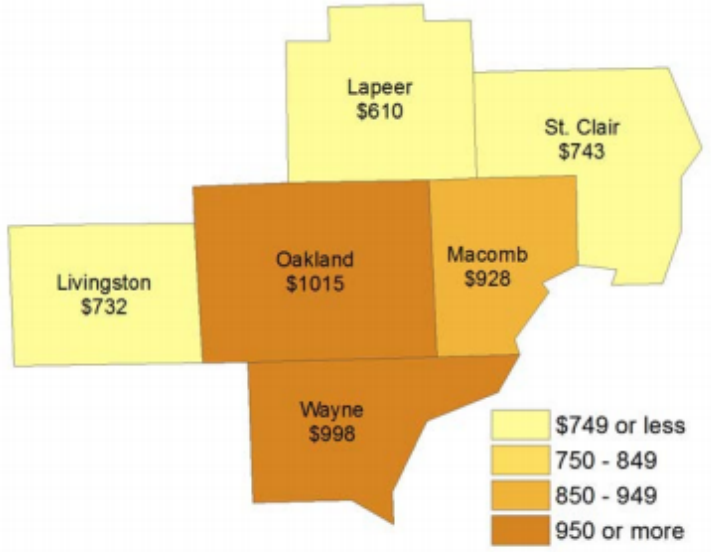
This summary presents a sampling of economic information for the area; supplemental data are provided for regions and the nation. Subjects include **unemployment**, **employment**, **wages**, **prices**, **spending**, and **benefits**. All data are not seasonally adjusted and some may be subject to revision. Area definitions may differ by subject. For more area summaries and geographic definitions, see www.bls.gov/regions/overviews.htm.

Unemployment rates for the Detroit area, selected area counties, and the nation

Source: U.S. BLS, Local Area Unemployment Statistics

Average weekly wages for all industries by county

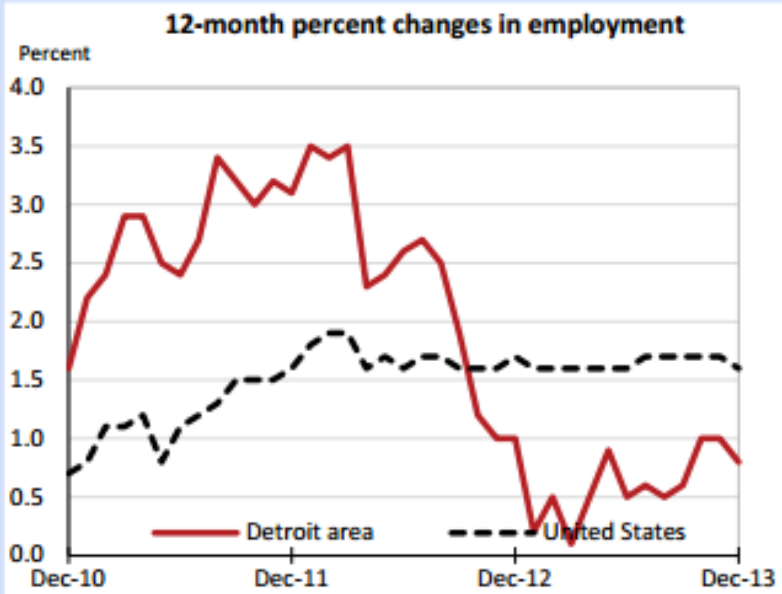
Detroit area, 2nd quarter 2013
(U.S. = $921; Area = $974)



Source: U.S. BLS, Quarterly Census of Employment and Wages

Detroit Area - Economic Summary

Over-the-year changes in employment on nonfarm payrolls and employment by major industry sector



Source: U.S. BLS, Current Employment Statistics

Detroit area employment (numbers in thousands)	Dec. 2013	Change from Dec. 2012 to Dec. 2013	
		Number	Percent
Total nonfarm	1,854.4	14.5	0.8
Mining, logging, and construction	53.3	2.4	4.7
Manufacturing	231.5	5.8	2.6
Trade, transportation, and utilities	356.4	3.0	0.8
Information	27.0	0.5	1.9
Financial activities	97.6	-3.2	-3.2
Professional and business services	354.2	13.2	3.9
Education and health services	297.3	-1.9	-0.6
Leisure and hospitality	167.7	-1.5	-0.9
Other services	74.9	-1.1	-1.4
Government	194.5	-2.7	-1.4

Source: U.S. BLS, Current Employment Statistics

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Automotive Average Hourly Earnings

National Average Hourly Earnings

Average Hourly Earnings -- Not Seasonally Adjusted

Data series	Back data	Annual average: 2013	Nov. 2013	Dec. 2013	Jan. 2014	12-month change: Jan. 2013 - Jan. 2014
Average hourly earnings (of production and nonsupervisory workers)						
Manufacturing						
Motor vehicles and parts manufacturing		(P) $21.05	$21.62	(P) $21.52	(P) $21.21	(P) $0.29
Motor vehicles manufacturing		(P) 27.77	28.61	(P) 28.06		
Motor vehicle bodies and trailers		(P) 16.95	17.59	(P) 17.39		
Motor vehicle parts manufacturing		(P) 19.65	20.01	(P) 20.01		
Wholesale Trade						
Motor vehicle and parts wholesalers		(P) 19.09	19.54	(P) 19.64		
Retail Trade						
Motor vehicle and parts dealers		(P) 18.35	18.44	(P) 18.55		
Automobile dealers		(P) 19.85	19.98	(P) 20.18		
Other motor vehicle dealers		(P) 17.55	17.57	(P) 17.56		
Auto parts, accessories, and tire stores		(P) 15.15	15.18	(P) 15.13		
Other Services						
Automotive repair and maintenance		(P) 16.19	16.52	(P) 16.69		

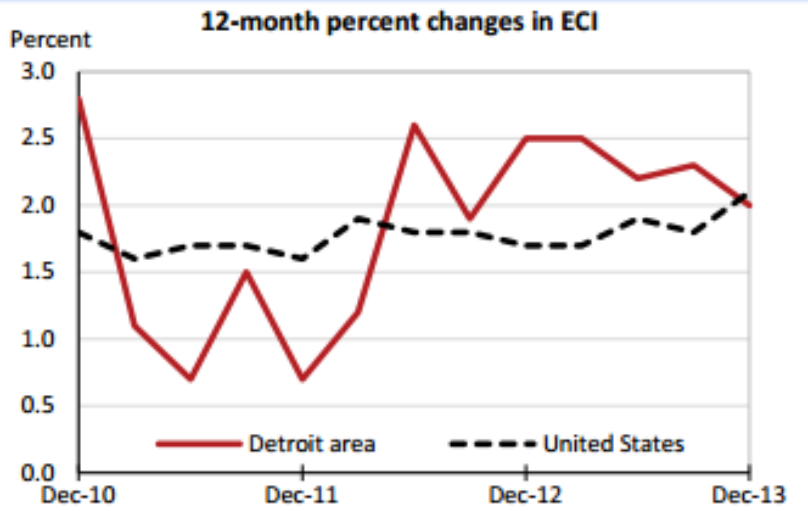
Average Wage Changes

Employer costs per hour worked for wages and selected employee benefits by geographic division

Private industry, September 2013	East North Central (1)	United States
Total compensation	$28.32	$29.23
Wages and salaries	19.56	20.55
Total benefits	8.77	8.68
Paid leave	1.88	2.01
Vacation	1.01	1.04
Supplemental pay	0.81	0.80
Insurance	2.65	2.39
Retirement and savings	1.09	1.07
Legally required benefits	2.34	2.40

(1) East North Central includes IL, IN, MI, OH, and WI.
Source: U.S. BLS, Employer Costs for Employee Compensation

Over-the-year changes in wages and salaries



Source: U.S. BLS, Employment Cost Index

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Auto Industry Employment

Employment -- Not Seasonally Adjusted

Data series	Back data	Annual average: 2013	Nov. 2013	Dec. 2013	Jan. 2014	12-month changes: Dec. 2012 - Dec. 2014	12-month changes: Jan. 2013 - Jan. 2014
Employment (all employees, in thousands)							
Manufacturing							
Motor vehicles and parts manufacturing		(P) 820.2	838.8	(P) 844.0	(P) 844.2	(P) 45.0	(P) 46.6
Motor vehicles manufacturing		(P) 178.3	185.8	(P) 186.8		(P) 15.0	
Motor vehicle bodies and trailers		(P) 134.1	136.2	(P) 136.2		(P) 6.1	
Motor vehicle parts manufacturing		(P) 507.8	516.8	(P) 521.0		(P) 23.9	
Wholesale Trade							
Motor vehicle and parts wholesalers		(P) 327.0	330.8	(P) 331.1		(P) 9.2	
Retail Trade							
Motor vehicle and parts dealers		(P) 1,792.0	1,815.1	(P) 1,812.0	(P) 1,800.0	(P) 64.3	(P) 62.8
Automobile dealers		(P) 1,136.5	1,152.4	(P) 1,152.1	(P) 1,148.5	(P) 43.7	(P) 41.4
Other motor vehicle dealers		(P) 132.7	131.3	(P) 128.4		(P) 4.7	
Auto parts, accessories, and tire stores		(P) 522.8	531.4	(P) 531.5		(P) 15.9	
Other Services							
Automotive repair and maintenance		(P) 841.7	839.0	(P) 838.8		(P) 7.5	

Automotive Jobs by State

Employment in Selected States

Employment -- Not Seasonally Adjusted

Data series	Back data	Annual average: 2012	Oct. 2013	Nov. 2013	Dec. 2013	12-month change: Dec. 2012 - Dec. 2013
Employment (all employees, in thousands)						
Manufacturing						
Motor vehicles and parts manufacturing						
Motor vehicles manufacturing						
Alabama			11.4	11.4	(P) 11.4	(P) 0.4
California			3.3	3.3	(P) 3.3	(P) 0.1
Indiana			16.1	16.0	(P) 15.9	(P) 0.8
Kentucky			16.3	16.5	(P) 16.3	(P) 0.8
Michigan			43.4	43.5	(P) 43.3	(P) 0.7
Missouri			5.5	5.7	(P) 5.8	(P) 1.6
Ohio			16.9	18.2	(P) 18.0	(P) -2.1
Texas			9.9	9.9	(P) 9.9	(P) 0.9
Motor vehicle bodies and trailers						
Indiana			30.1	30.4	(P) 30.1	(P) 0.8
Motor vehicle parts manufacturing						
Alabama			22.3	22.3	(P) 22.3	(P) 2.4
California						
Indiana			55.8	56.5	(P) 56.6	(P) 2.1
Kentucky			30.2	30.4	(P) 30.6	(P) 0.1
Michigan			108.9	110.1	(P) 110.3	(P) 4.6
Mississippi			5.0	5.0	(P) 5.2	(P) 0.6
New York			10.3	10.3	(P) 10.3	(P) -0.3
Ohio			63.9	63.8	(P) 64.0	(P) 1.0

Key to Standardization and Continual Improvement

ON-THE-JOB TRAINING

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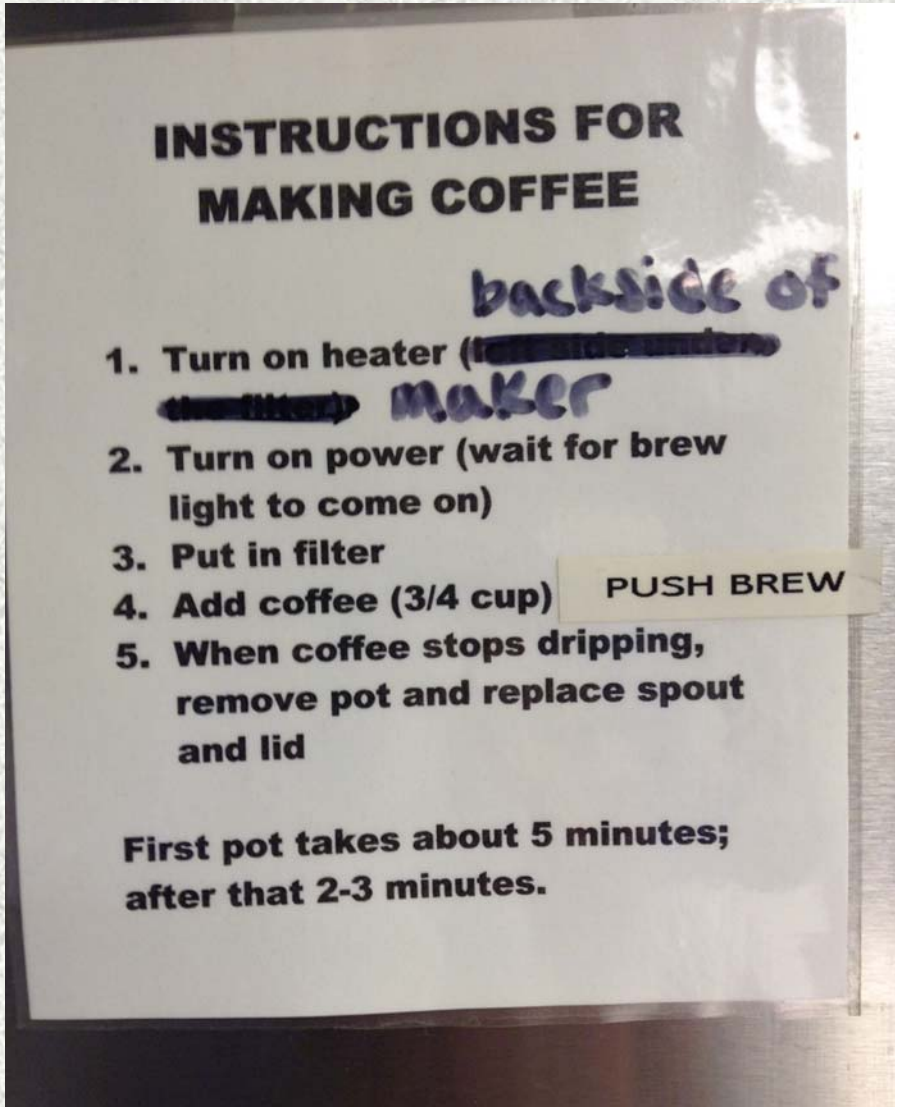
Coffee Server Example

- Trained OJT
  - Natural training
  - Unstructured process
  - In workplace
  - During production
- Not Standardized
  - Personal preference OK
  - It's simple



The Coffee Center

- Explain process
  - Assume transferable skills
- "Watch me do one pot"
- Any questions?

Coffee Server- 2 Months Later

- Pour water into top
- Wait for heating green light
- Well rounded ¼ cup scoops
- Fill hot water carafe
  - Coffee stained warm water
  - JIT alternative from spigot
- Cleanup standard unknown
  - Many eyes silently inspecting
- Short interval scheduling
  - Number carafes recorded on log
- Trash can placement
  - Forgot and placed wrong location
- Counter space for cups & books
- Towel placement for drips
- The main objective - serve

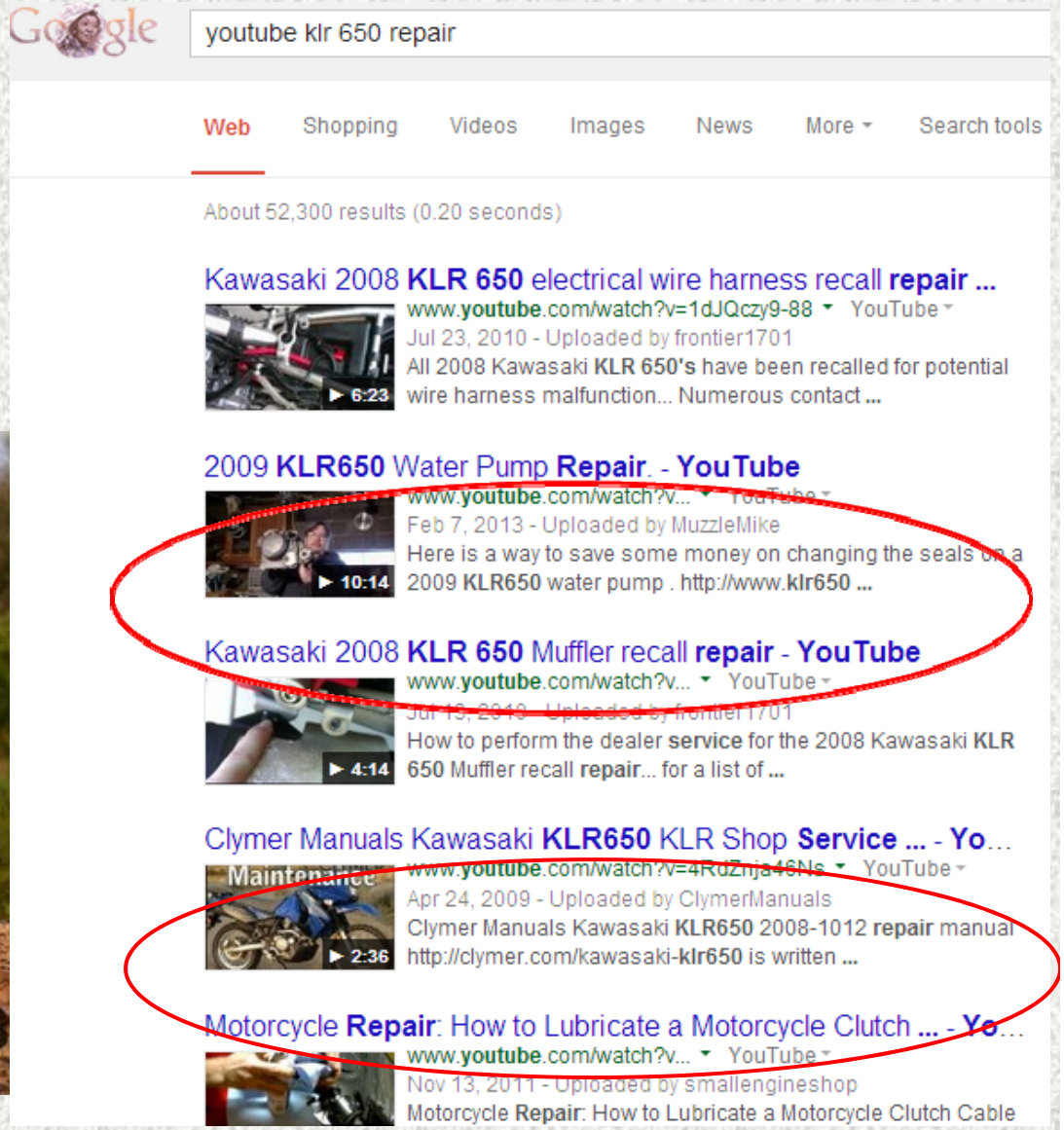
- OJT Training Objective Met?

How do we learn today?

- ❑ Trial & Error
- ❑ Imitating
- ❑ Search Engines
- ❑ On-the-Job Training (OJT)
- ❑ Structured OJT
- ❑ Plan – Do – Check - Act
- ❑ Courses
- ❑ Manuals
- ❑ Methods
- ❑ YouTube

Popular KLR-650 Motorcycle

- Explain how
- Identify key points
- Warn of exceptions



YouTube Enhancement Features

- **Auto-fix**
  - Performs a one click-fix to enhance the video's lighting and color. You can also make manual adjustments to Fill Light, Contrast, Saturation, and Color Temperature by using the sliders.
- **Stabilize**
  - Adjusts the video to correct any shakiness
- **Slow Motion**
  - Slow the speed at which your video plays (half speed, quarter speed, eighth speed)
- **Trim**
  - Clip parts off the beginning and/or end of your video
- **Filters**
  - This tab shows pre-set color filters that you can apply to your video to give them a stylish and unique look
- **Face blurring**
  - Protect the anonymity of people in your video. Click on Special effects to access this feature

Learning Will Occur

- The questions are:
  - From whom or what?
  - What will they learn?
  - How will they learn?
  - When will they learn?
  - Will they remember?
  - What are the +/- consequences?
  - How will they respond to inevitable exceptions?
  - Will all performers be trained or retrained?

Training Matrices

Who	Job 1 Date	Job 1 Trained Date	Job 2 Date	Job 2 Trained Date	…
Mary					
Fred					
Joe					
Susan					

<u>Symbols Indicating Training Level</u>

- o Not trained
- ❖ In-Training or Learning
- ▪ Trained
- ✓ Need Retraining
- ➢ Trainer

Job # Trained Date: Last date confirmed trained at indicated level

Who are We Training?

- Silent Generation born 1925 - 1942
  - Silent and waiting for the hand of fate to fall
- Baby Boomers born 1946 – 1964
  - Redefined traditional values and expecting better
- Generation X born 1960's – 1970's
  - Individual freedom, stability, diversity & human rights
- Millennials born 1980's – 1990's
  - "Me," narcissistic, entitled, less need to define life meaning, optimistic, and participation can be enough
- Generation Z born 2000's – 2010's
  - Connected to media and start their search on YouTube. Want to contribute opinions online and follow authority

5 Surprising Social Media Statistics that Will Make You Rethink Your Social Strategy

- Twitter's fastest growing age demographic is 55–64
- 189 Million Facebook users are "Mobil Only"
- YouTube reaches more U.S. adults aged 18–34 than any cable network
- 25% of smartphone owners ages 18–44 say they can't recall the last time their smartphone wasn't next to them
- 25% of Facebook users don't bother with privacy settings

Training Within Industry (TWI)

- 1940 WWII response to trained worker need
  - The Silent Generation
- Train the Trainer (1.6 million trained)
  - Job Instruction (JI)
    - Break jobs into defined steps
    - Show method while explaining key points with reasons
    - Watch student practice and coach until trained
  - Job Methods (JM)
    - Method for observing work and evaluating each step
    - Answer specific questions for each step
      - Eliminate, combine, rearrange or simplify
      - Estimate safety, quality, quantity, and cost benefits
- The Foundation for Lean
  - Dinero, D. (2005). *Training within industry: The foundation of lean*. Productivity Press.
- Foundation of Toyota Production System

HOW TO GET READY TO INSTRUCT

Have a Time Table—
how much skill you expect him to have, by what date.

Break Down the Job—
list important steps.
pick out the key points. (Safety is always a key point.)

Have Everything Ready—
the right equipment, materials, and supplies.

Have the Workplace Properly Arranged—
just as the worker will be expected to keep it.

Job Instruction Training

TRAINING WITHIN INDUSTRY
Bureau of Training
War Manpower Commission

KEEP THIS CARD HANDY

GPO 16—35140-1

Front of the Job Instruction Card

HOW TO INSTRUCT

Step 1—Prepare the Worker
Put him at ease.
State the job and find out what he already knows about it.
Get him interested in learning job.
Place in correct position.

Step 2—Present the Operation
Tell, show, and illustrate one IMPORTANT STEP at a time.
Stress each KEY POINT.
Instruct clearly, completely, and patiently, but no more than he can master.

Step 3—Try Out Performance
Have him do the job—correct errors.
Have him explain each KEY POINT to you as he does the job again.
Make sure he understands.
Continue until YOU know HE knows.

Step 4—Follow Up
Put him on his own. Designate to whom he goes for help.
Check frequently. Encourage questions.
Taper off extra coaching and close follow-up.

16—35140-1

If Worker Hasn't Learned, the Instructor Hasn't Taught

Back of the Job Instruction Card

JOB BREAKDOWN SHEET - By Josh Howell, 11/20/13 www.lean.org/LeanPost/Posting.cfm?LeanPostId=107#.UzBDVvldWSo

Description:	**Folding a t-shirt**
Parts:	
Tools and Materials:	One t-shirt (preferably laundered)

Important Step (What) **A logical segment of the operation when something happens to advance the work**	**Key Points (How)** **Anything in a step that might:** **1. Make or break the job** **2. Injure the worker** **3. Make the work easier**	**Reasons (Why)** **Reasons for the key points**
1. Lay flat	• facing up, top to the right	• consistent starting point
2. Pinch top	• right hand, halfway between collar and seam • through both layers • left hand, create vertical crease	• proper alignment • holds shirt together • visual aid
3. Pinch middle	• left hand, halfway down vertical crease	• proper alignment
4. Pinch bottom	• right hand over left hand, bottom of vertical crease	• proper alignment
5. Uncross hands	• holding pinches, shake out	• removes wrinkles
6. Flop and fold	• face down • over exposed sleeve	• exposes final fold • completes fold

NUMMI Success with UAW

- John Shook presentation "*Training Within Industry and Toyota – A look at the role of TWI in Toyota and TPS*"
  - First TWI Summit in Orlando, FL, June 6, 2007
- TWI (TJI) formed basis of Toyota's core training
- NUMMI quality & productivity levels close to Takaoka Japan in about one year
- Standardized work & Kaizen replaced JM

Shook, John (2010). How to change a culture: Lessons from NUMMI. MIT Sloan Management Review, 51(2), 63-68.

- *"…the union and workers didn't just accept Toyota's system, they embraced it with a passion*."
- "*…the way to change culture is not to first change how people think, but instead start by changing how people behave …*"
- "*It is easier to act your way to a new way of thinking than to think your way to a new way of acting*."
- "*It was communicating clearly to employees what their jobs were and providing the training and tools to enable them to perform those jobs successfully."*

TWI - Charles Allen's 4-Point Method

- Preparation
- Presentation
- Application
- Testing

OJT Objectives

- Easy to develop, maintain and improve
- Material that supplements a natural method teaching how-to, why, and projecting expectations for success

The Most Frequent Training Method?

STRUCTURED ON-THE-JOB TRAINING

S-OJT Training Method

- Show and explain what is done
- Show and explain how it is done while focusing on key points
- Review key points
- Show method with key points and explain reasons

S-OJT Training Method

- Exaggerate actions and pause for student to see closely
- Confirm training is presented at a rate that will ensure success
- Limit each training session to 30 to 60 min.
- Try while teacher observes
  - Coach without being overbearing

S-OJT Training Method

- Student performs while explaining each step and key point
- Decide what portion of the work that the student can do on their own.
  - Trainer available
- Key points must be followed exactly
- Follow-up session to confirm conformance, productivity, quality and key point understanding

Key point documentation, continually improved by those who can and do

ONE-POINT-LESSONS (OPL)

One Point Lesson – What is it?

- < 50 words
- Handwritten
- Key point focused
- On-the-job training enabler

P: Post on team board for one week

D: Test one week

C: Check and confirm value

A: Controlled copy, working copy in OJT training book and updated training matrix

One Point Lesson (OPL) Value

- Ownership
  - Owned by those who do, understand, and improve
- PDCA
  - Idea, write, post, test, check, agree, train, re-think, improve…
- OJT
  - Focus on transferring the key point how and why
- Standardization
  - Fulfill requirements
  - Follow and understand key points
- Training and Retraining
  - Training matrix enables

OPL - Purpose

- Key “how-to” job instruction points focus on:
  - Safety
  - Quality
  - Productivity
  - Technique
- Explain:
  - Method
  - Trouble-shooting

OPL - Guidelines

- One page
- One subject
- Delivered in 10 minutes or less
- Mostly picture(s)
- Fifty words or less

OPL - Guidelines

- Resist conversion to computer
  - May be infrequently necessary
  - Easier to PDCA a new idea
  - “Doers” maintain ownership
- Post in work area for :
  - ___ days prior to team review
  - ___ days prior to placing in OPL book

OPL - Guidelines

- Periodic OPL Team Review
  - Proposed OPL test decisions
  - Tested OPL approval, change, or reject
  - OPLs review on standing agenda
  - Review date placed on OPL
    - Training matrix updated
- Master book in supervisor's office
  - Copy inserted in master following team approval

OPL - Document Control

- Cross-trained performers review OPL binder for changes since they last performed tasks
- REVIEW with Quality System Auditor
  - Resist bureaucracy
    - Increases costs, slows change, reduces use …
- Resist making OPL a controlled document
  - Contain no specifications
  - Training is OJT and OPLs are guides
  - Method may be controlled

Why is OJT Important

- Enable flexible assignment
- Increase job's value-added %
- Improve worker engagement
- Improve worker productivity
- Increase worker capability and wages

How does S-OJT relate to Lean or Six Sigma?

STRUCTURED ON-THE-JOB TRAINING

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S-OJT Relationship to Lean and Six Sigma

- Training Within Industry (TWI)
  - Job Instruction Methodology
- Variation reduction
- Continual improvement collaboration
- Training records and control

S-OJT Relationship to Lean and Six Sigma

- Standardized work
  - Layout and activity sequence to achieve takt time
- Operation Instruction Sheet
  - Standardized method key points in binder
  - One-Point lessons (OPL)

Why is Structured OJT (S-OJT) Important?

- Stabilization
- Standardization
- Flexible labor assignment
- Waste reduction
- Baseline for continual improvement

RESEARCH PROJECT

Questions Related to OJT

- How have workforce changes affected preferred training methods?
  - By generation and within generations
- How do these changing workforce characteristics and changing media effect preferred OJT methods?
- Might we use the scientific method to learn how to best train OJT?

Proposed Study

- Study effects of structured on-the-job training factors
  - Better understand factor effects and interaction
- Focus on young adults 18 to 30 years of age.
  - Millennial Generation
- TWI method
  - Show ‘em, tell ‘em, watch ‘em, they do and tell, practice, and capability confirmed
- Job-Aides
  - Methods
  - One-Point-Lessons (OPL) for key points
  - Video training with accented or simulated key points
    - EMU Simulation and Gaming program to develop and select best method

Project Goals

- Evaluate structured on-the-job training feature effectiveness
- Measure key factor interaction and effects
  - Method presentation
  - Video
  - Key point presentation
  - Trainer method
- Subject Group:
  - Young adults – Millennial Generation (18 to 30 yrs. of age)
- Effects:
  - Quality
  - Time
  - Initial post-training and retention

Why? OJT Training Need

- Organization apply OJT due to:
  - **Change** frequency of service or products
  - **Continual** improvement expectations
  - **Cost** of training
  - **Flexibly** assigned work force
  - **Natural** training method
  - **Short** production runs or mixed models
  - **Speed** of training
  - **Variety** of routine or non-routine tasks

Why Change a Natural Process and Make it Structured? (S-OJT)

- Defect-free requirements
- Competition
- Complexity
- Changing workforce
- Technology changes
- Free workers to innovate
- PDCA change process
- Variation reduction

S-OJT Research Question

- How do varying combinations and levels of training media, methods and job aides interact and effect structured on-the-job training effectiveness and retention?

- Answers to this question may benefit all manufacturing and service organizations
  - Expect to be generalizable to other industries, non-assembly work, and service jobs types that employ varying levels of structure within their OJT practices.

Experimental Methodology

- Independent Variables or Factors:
  - Method type
  - Video or enhanced video
  - Key point descriptions
  - Instructor training method
- Dependent Variables:
  - Assembly quality
  - Assembly time
  - Initial post-training and retention

Methodology

- Design of Experiment:
  - Full factorial design
    - Follow-up studies - fractional designs
  - 324 trials
    - Six replications
- Measure factor effects and interaction
- Figure 1 summarizes the planned experiment factors and levels

Figure 1. Experiment Factors and Levels

		Factor Levels		
X#	**Factor**	**Level 1**	**Level 2**	**Level 3**
X1	Instruction Method	Product Requirements	Standard Method	Key-Point Focused (TWI) Method
X2	Video	None	Video Method	Simulation or Enhanced Video
X3	Key Method Step(s) or One Point Lesson	~~*None*~~	Job(s) Aide 120 words	OPL(s) Photo < 50 words
X4	Instructor Training Method	Tell `em	Tell `em and Show `em	Tell, Show, Watch, Feedback

Expected Benefits

- Quantified factor effects and interactions
- Training method selection and justification
  - Develop and sustain structured OJT training
    - Methods
    - Media
    - Job aides
    - Training records
- Standardization – Continuously improved

Project Plan

- Solicit Manufacturer Partner
  - Refine experiment design to provide usable outcomes
  - Identify representative assembly activity
    - Possibly a standardized training method
  - Provide equipment and parts to conduct the experiment
  - Conduct experiment(s) at manufacturer site and/or at Eastern Michigan University
    - Compare and contrast findings

EMU Site Methodology

- Graduate student solicits subjects in separate booth
- Experiment conducted in room with two graduate students.
  - GS1 collects subject data & conducts simple standardized assembly capability test
  - Preferred behavior (DISC) questions & Demographics
  - GS2 trains students according to the factor levels that are indicated on the subjects data form

Methodology

- Subject learns method & assembles product w/GS2
  - Assembly time & continuous quality measure(s) recorded.
- Subject completes post-test subjective evaluation w/GS1
- GS1 asks subject to repeat test in “X” days
- Subject returns to complete the subject in “X” days

Research Needs

- Funding
  - Requested EMU to provide $3,000 for Graduate Assistants (Faculty Research Fellowship)
    - Participation Incentive(s)
    - Researchers and experiment administrators
- Manufacturing Partner
  - Confirm usefulness of expected study results
  - Representative assembly task for study
  - Able to conduct experiment at their site

ORIGAMI ASSEMBLY OPTION

Reproducible Origami Assembly

- Pre-test – Simple Origami to test transferable skills or applicable pre-knowledge
  - More likely for those with applicable knowledge
  - Will request self-reported experience evaluation
- Origami
  - Complete < one minute when competent
  - Continuous and measureable quality variable(s)
  - Able to store in folder for post-trial data collection

Origami Alternative

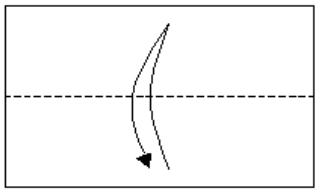
- Four trials
  - Offers time for coaching between cycles
  - Estimate for learning curve factor
    - % reduction for each cum. doubling of production qty.
- Flexibility for remote post-tests
  - Mail paper with same job-aids – record time and send back fold with start and stop time.
- Reproducible by other users
  - Compare user population with EMU Millennial

Origami Reproducible OJT Experiment?

Origami Popper

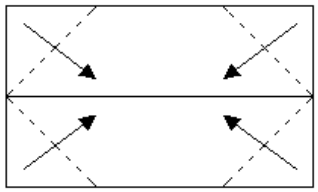
WWW.PHILTULGA.COM

1.



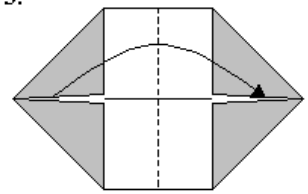
Fold paper in half, then unfold

2.



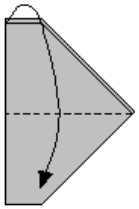
Fold corners in to center line

3.



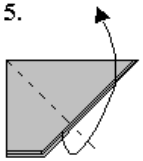
Fold in half from left to right

4.



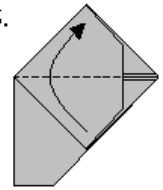
Fold in half from top to bottom

5.



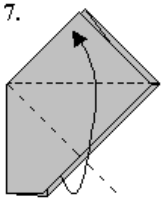
Slide your fingers inside top flap, open, and flatten

6.



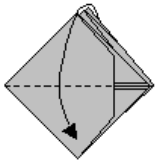
Fold bottom half of square up

7.



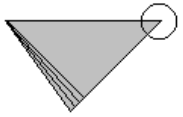
Repeat step 5 with bottom flap

8.



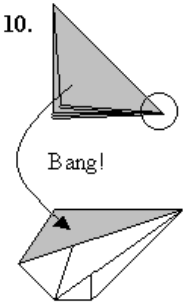
Fold three top triangles down

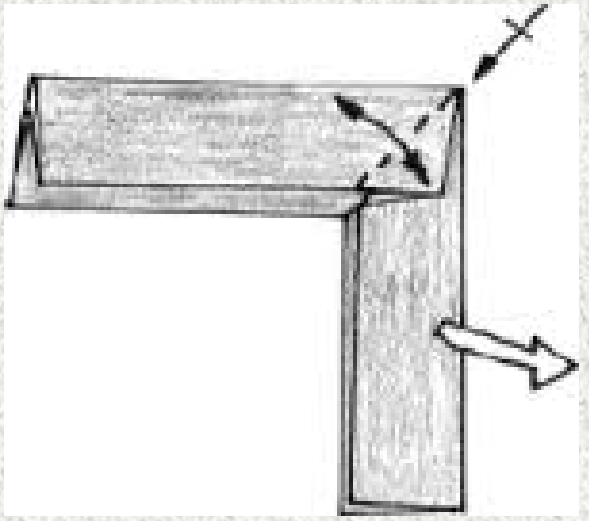
9.

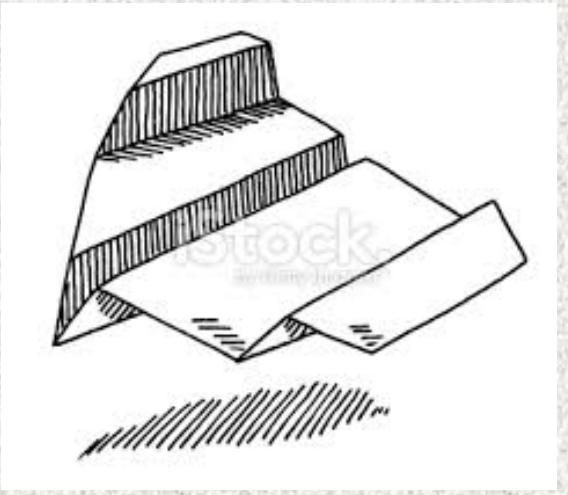


Hold corner (at the circle) then cock and snap your wrist - the inner flaps will fly open with a loud bang! Step 10

10.







Few How-to Video Options

- Fold faster Fold Faster Option
- Video option Folding example for video
- Too difficult? Difficult but fun toy
- Boomerang Boomerang
- Paper Popper Paper Popper - Easy & Check Funcionality Pop first time? How many trials?
- Paper Flix Football Paper Flix Football

Assembly Activity Characteristics

- COMPLEXITY
  - Requires cognitive and fine motor skills
  - Multiple key points
- TIME EFFECT
  - Assembly time varies based on level of skill and knowledge
- QUALITY CHARACTERISTICS
  - At least one continuous variable effected by key method step.

Pre-Test

- Assembly skill capability from test assembly
- Self-reported level of assembly experience
- Demographics

What Would I Like from You

- Assess the effectiveness of your OJT or S-OJT processes
  - Structured OJT process?
  - Standardized methods?
  - Key-points specified?
    - How are they documented? OPL?
  - Cross-training and retraining effectiveness?
    - Does re-training occur?
  - Ease of conducting and implementing change?
    - Who initiates, records, tests, implements and improves? PDCA?
  - Are your job aides effective?
    - Check sheets, key points, YouTube, OPL …
- Consider partnering with Dr. Bryan Booker to evaluate an effective and structured On-the-Job training process for your organization

Questions?

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