

Thinking About Procedures

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A Collaborative Project

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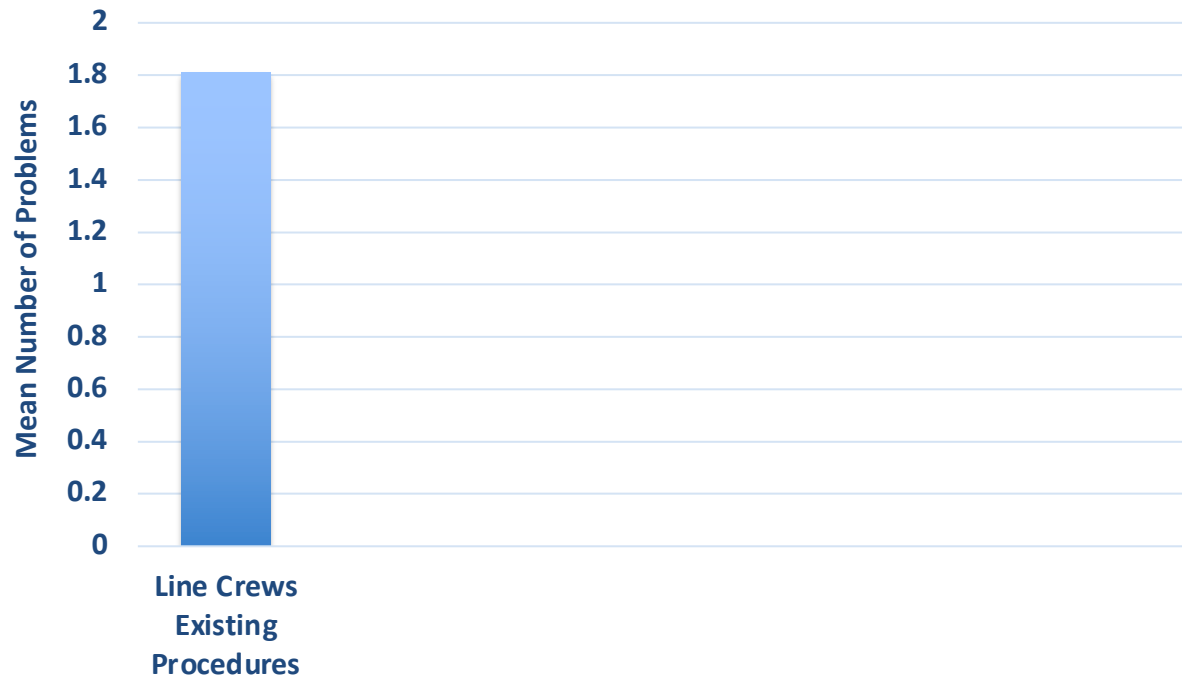
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- An iterative procedure design, development, and testing process.

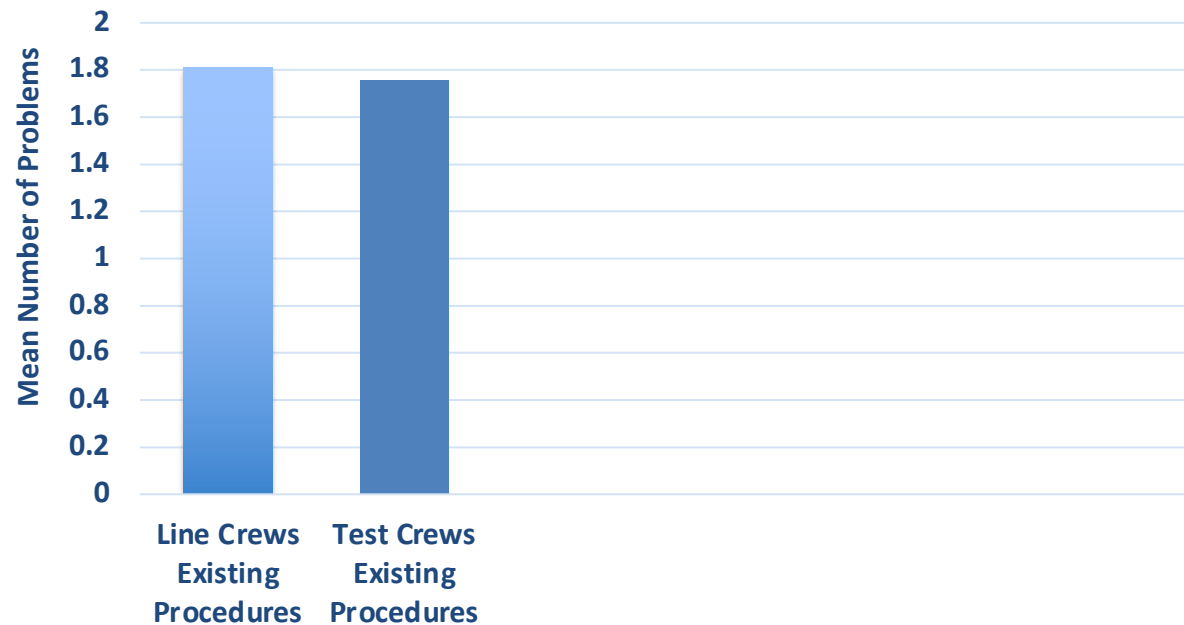
A Collaborative Project

- A complete redesign of all normal operations procedures and checklists.
- A detailed analysis of existing procedures and of the reality of the operation (incl. line observations, workarounds, techniques).
- An iterative procedure design, development, and testing process.
- An extensive validation and evaluation process.

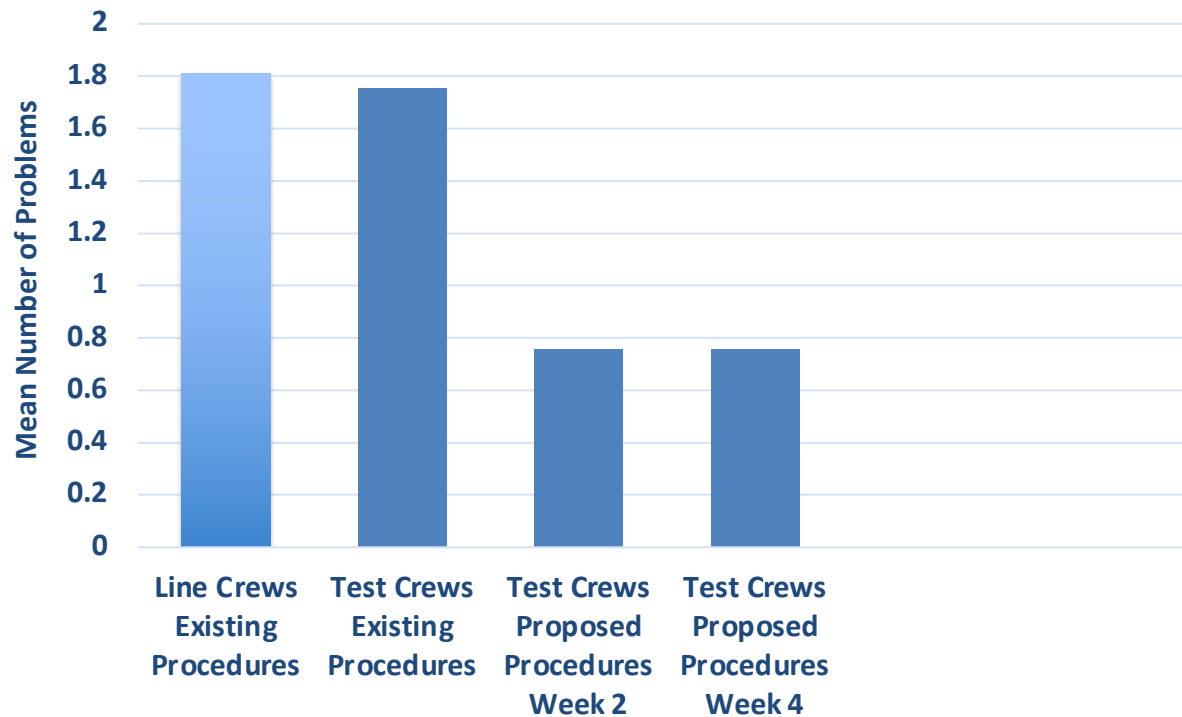
Mean Number of Problems on Target Items per Flight: Understanding Existing Operations



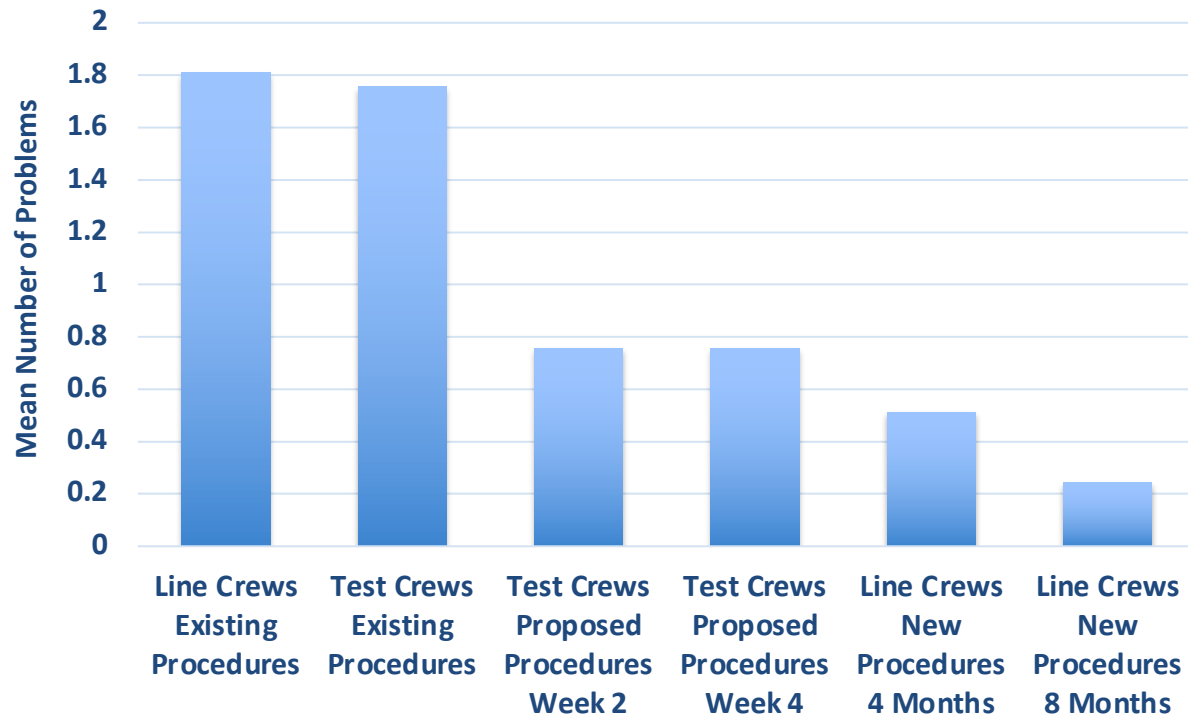
Mean Number of Problems on Target Items per Flight: Setting a Base Rate for the Validation of the Proposed Procedures



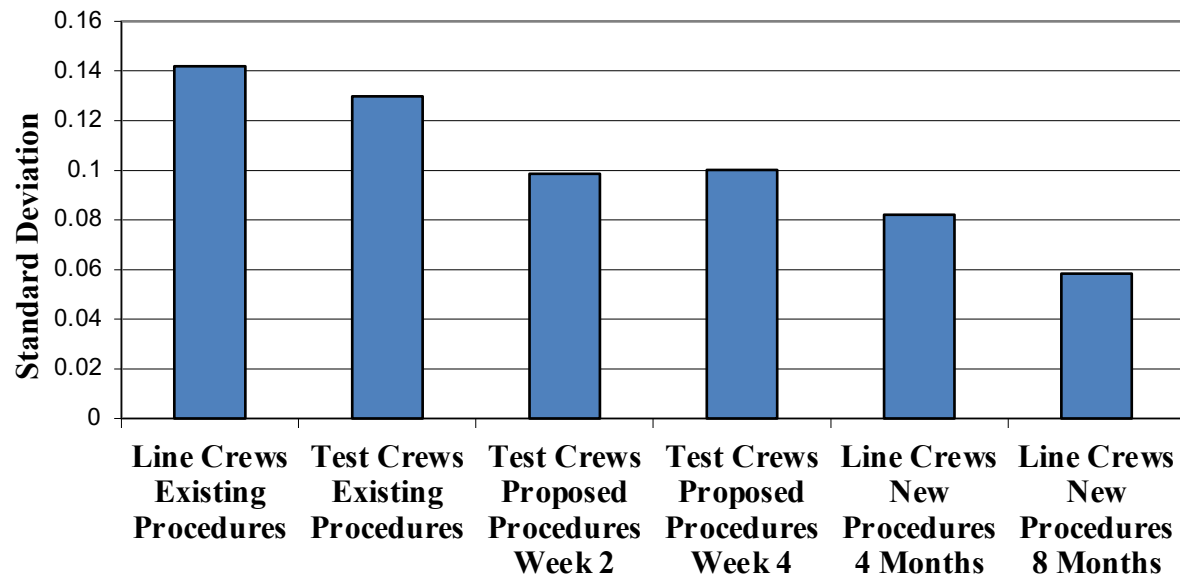
Mean Number of Problems on Target Items per Flight: Validating the Proposed Procedures



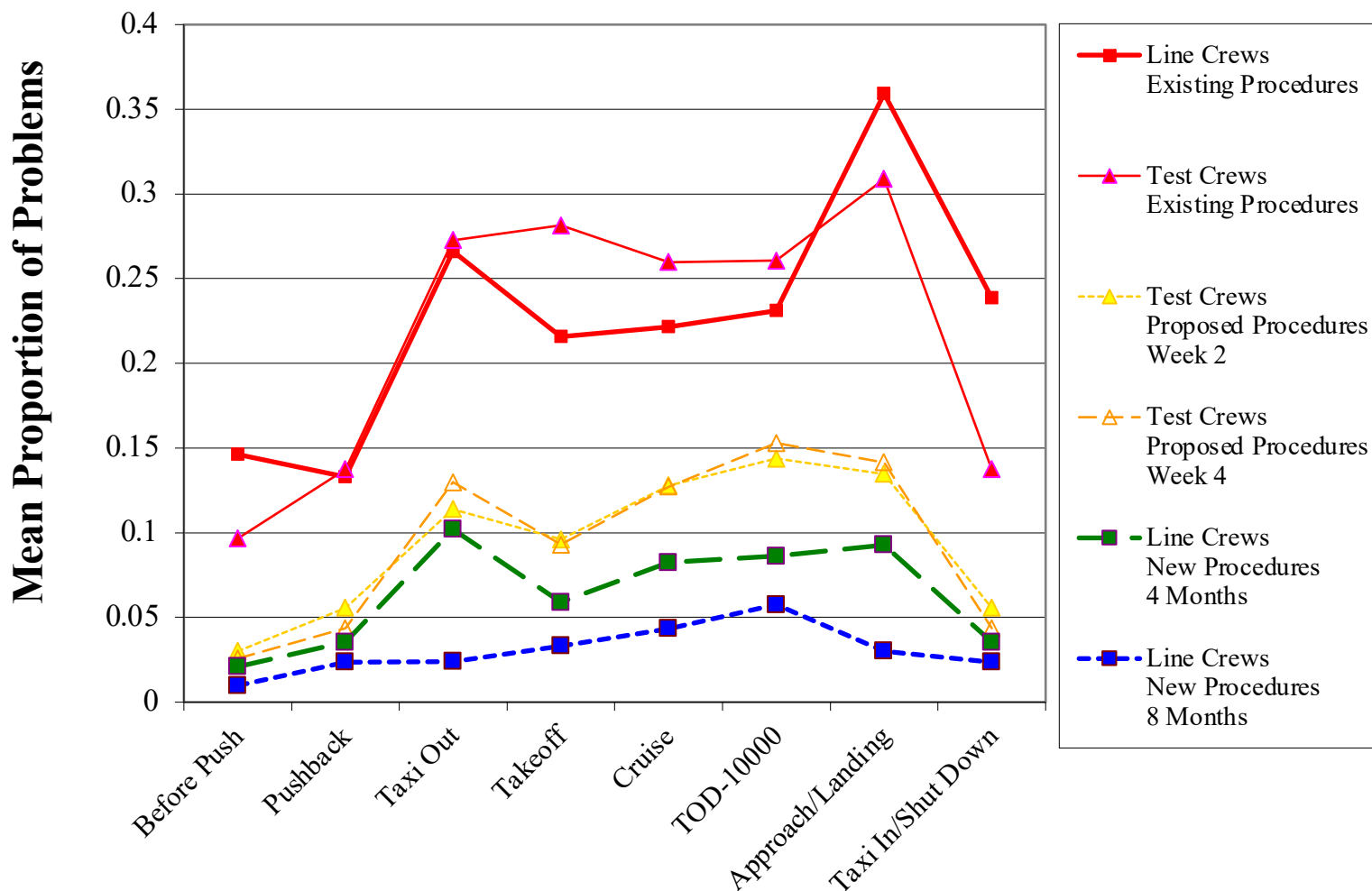
Mean Number of Problems on Target Items per Flight: The Complete Evaluation



Standard Deviation of Number of Problems on Target Items per Flight



Mean Proportion of Target Items Demonstrating Problems by Phase of Flight



Pilots' Perceptions of Flight Under the New Procedures Compared to Flight Under the Old Procedures 4 and 8 Months Following Adoption of the New Procedures

Question		Response	
Compared to legs flown under the old procedures, on this leg:		Worse	Same or Better
How well did things go overall?	4 Months	10.1 % (12)	90.0% [26.9 (32); 63.0 (75)]
	8 Months	2.2% (2)	97.8% [18.7 (17); 79.1 (72)]
How well did you and the other pilot communicate?	4 Months	3.4 % (4)	96.6% [26.1 (31); 70.6 (84)]
	8 Months	2.2% (2)	97.8% [23.1 (21); 74.7 (68)]
How well did you and the other pilot check / monitor each other?	4 Months	2.5 % (3)	97.5% [22.9 (27); 74.6 (88)]
	8 Months	3.3% (3)	96.7% [17.6 (16); 79.1 (72)]
How well did you and the other pilot check / monitor the aircraft systems?	4 Months	2.5 % (3)	97.5% [38.7 (46); 58.8 (70)]
	8 Months	0.0% (0)	100.0% [31.9 (29); 68.1 (62)]
How tired were you?	4 Months	10.9 % (13)	89.1% [66.4 (79); 22.7 (27)]
	8 Months	4.4% (4)	95.6% [69.2 (63); 26.4 (24)]
How stressed did you feel?	4 Months	12.6 % (15)	87.4% [53.8 (64); 33.6 (40)]
	8 Months	2.2% (2)	97.8% [58.2 (53); 39.6 (36)]
How much effort did you expend?	4 Months	15.1 % (18)	84.9% [44.5 (53); 40.3 (48)]
	8 Months	5.6% (5)	94.4% [42.2 (38); 52.2 (47)]
How rushed were you?	4 Months	13.4 % (16)	86.6% [21.0 (25); 65.5 (78)]
	8 Months	5.5% (5)	94.5% [22.0 (20); 72.5 (66)]

So what did we get?

- A significant reduction in error across all phases of flight.
- A significant improvement in standardization across crews.
- A very strong acceptance of the new procedures.
- A significant improvement in crews' experience.

But how did we do it?

By Taking a Comprehensive Approach.

- By understanding the complexity of the operation and of the operator.

By Taking a Comprehensive Approach.

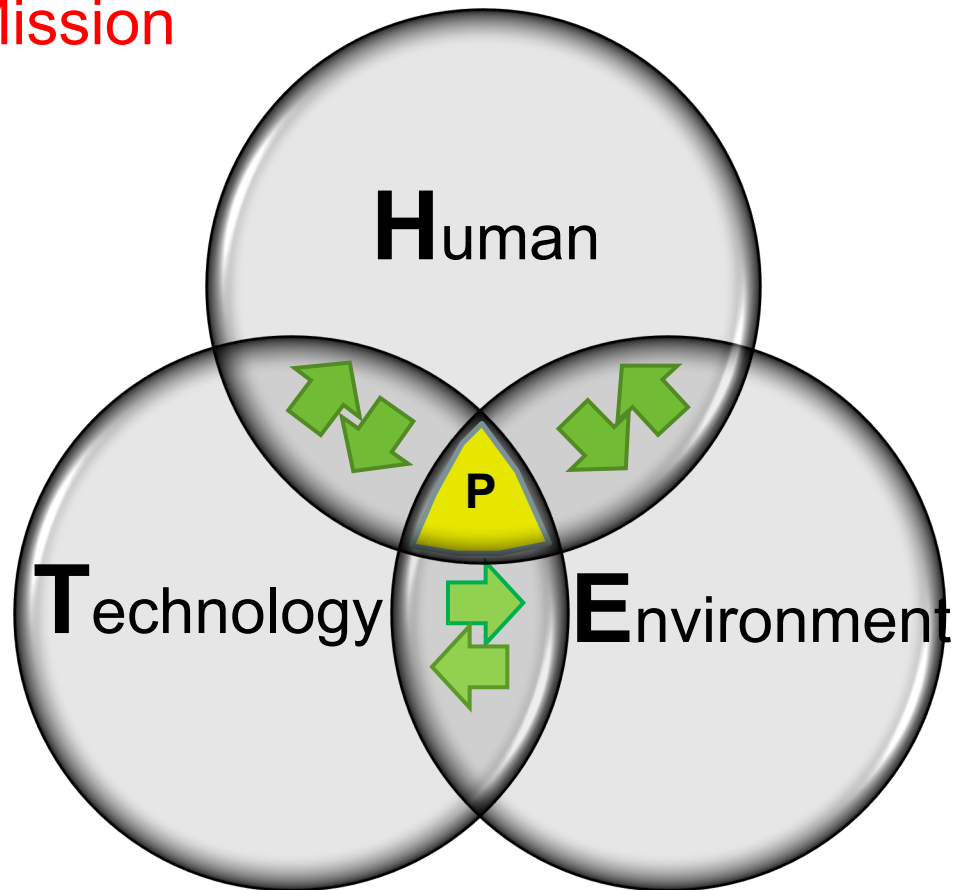
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- By creating a clear, coherent, consistent, and comprehensive guidance throughout.

By Taking a Comprehensive Approach.

- By understanding the complexity of the operation and of the operator.
- By creating a clear, coherent, consistent, and comprehensive guidance throughout.
- The 4C's, THE Model, and the 4P's.

Culture

Mission



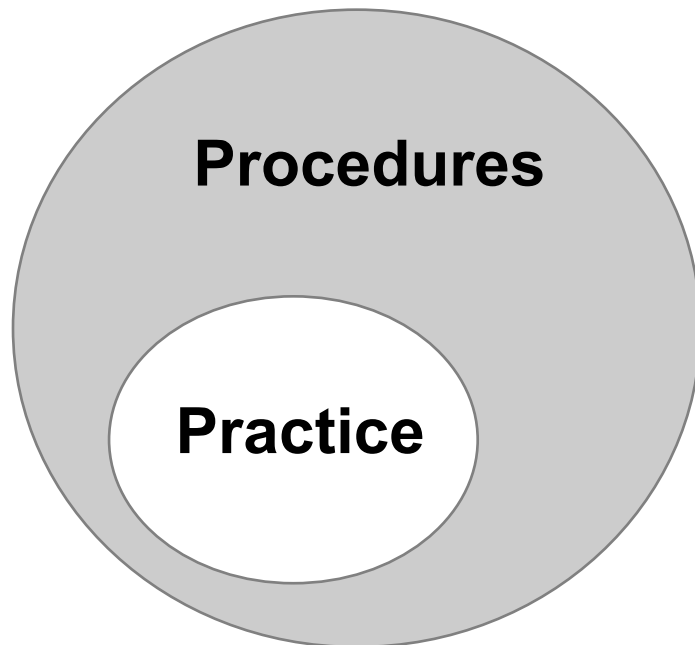
THE Model

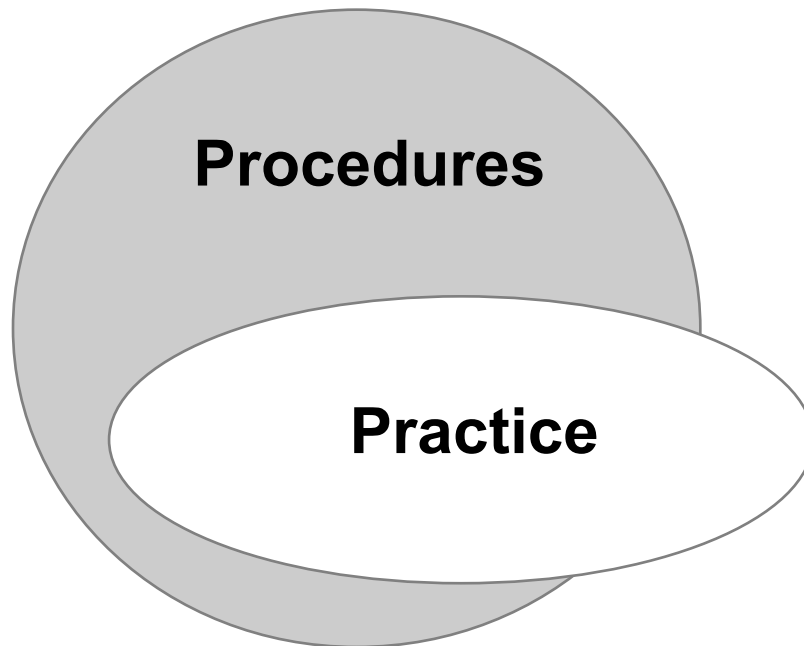


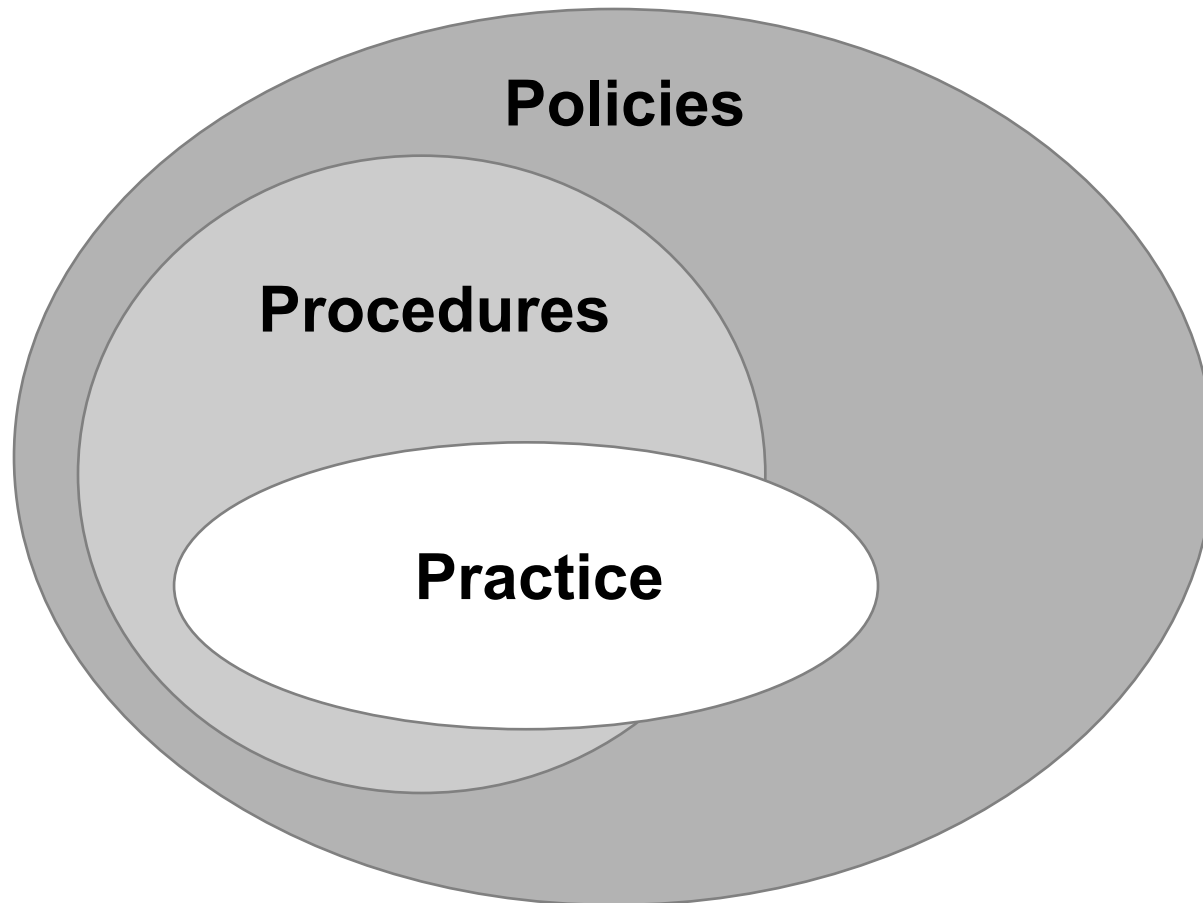
Human Systems
integration division

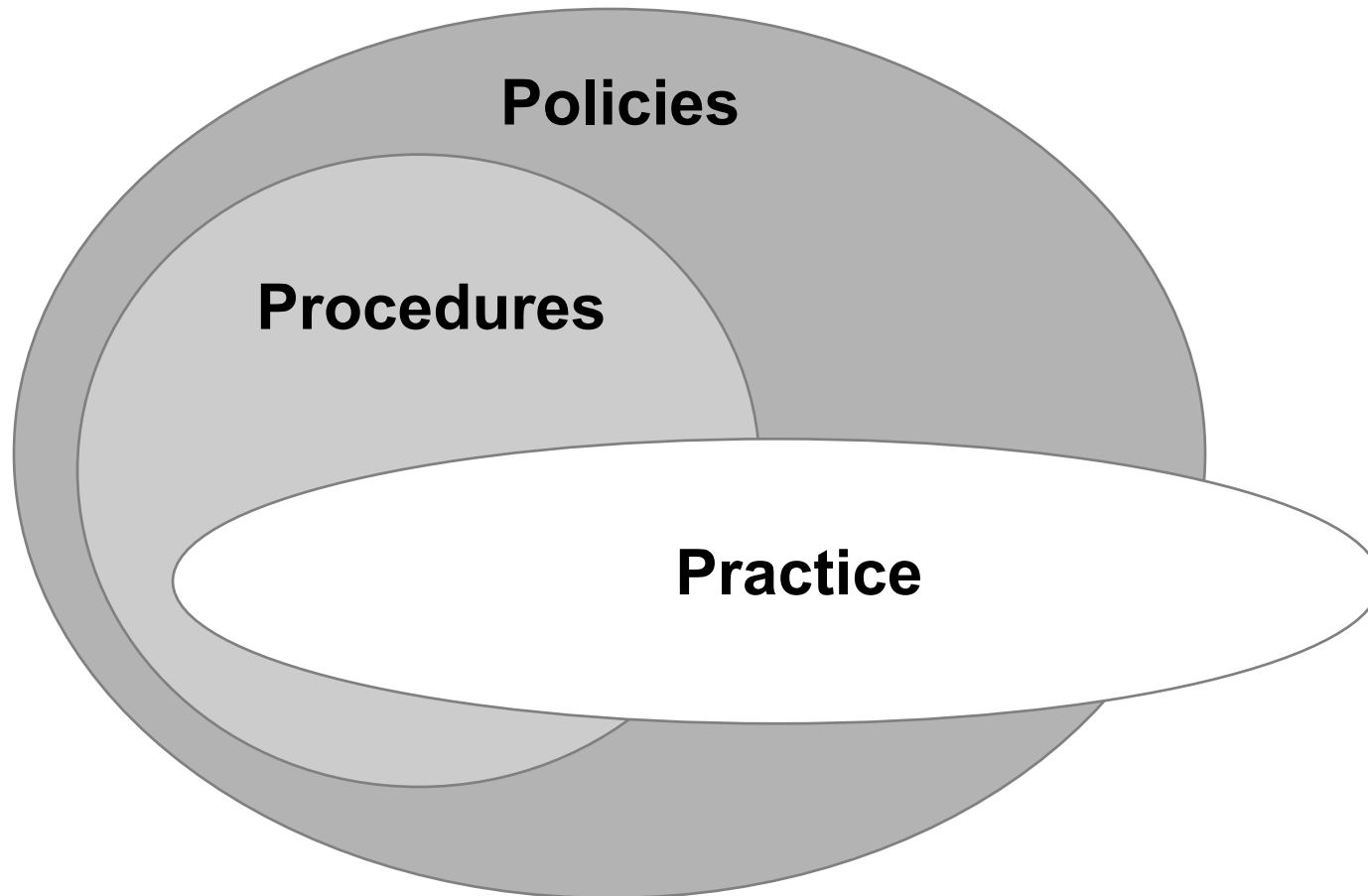


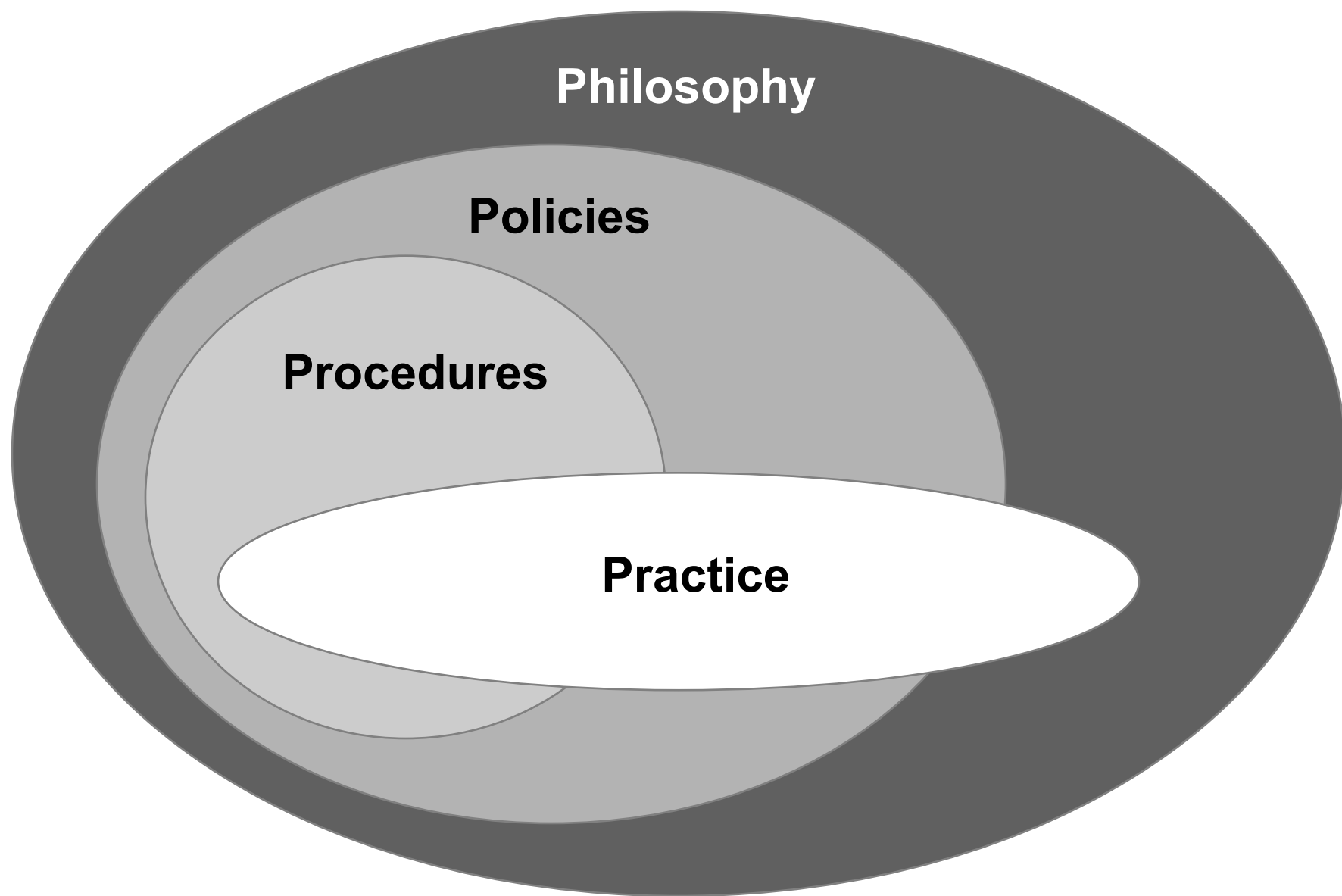
Practice



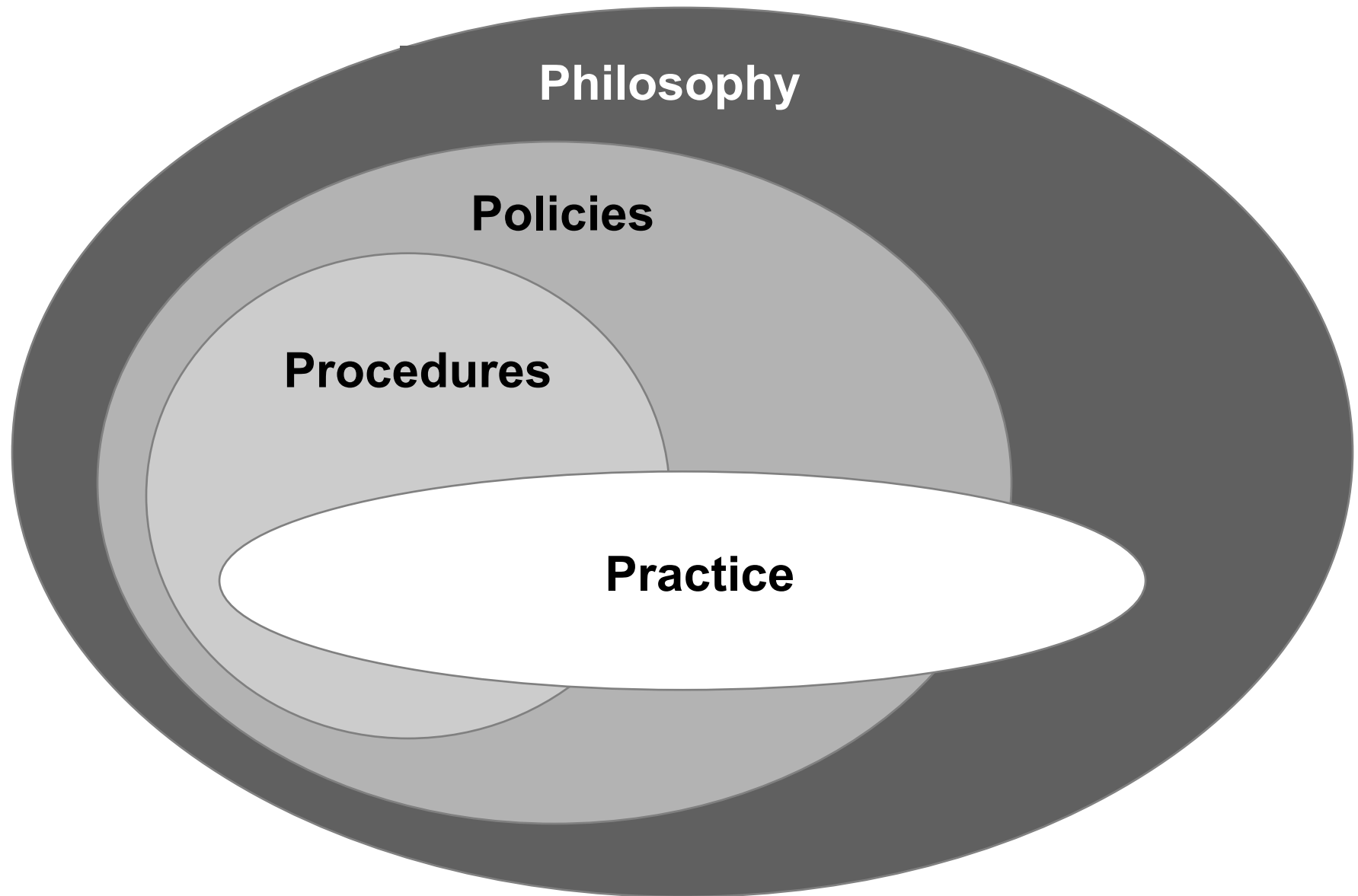




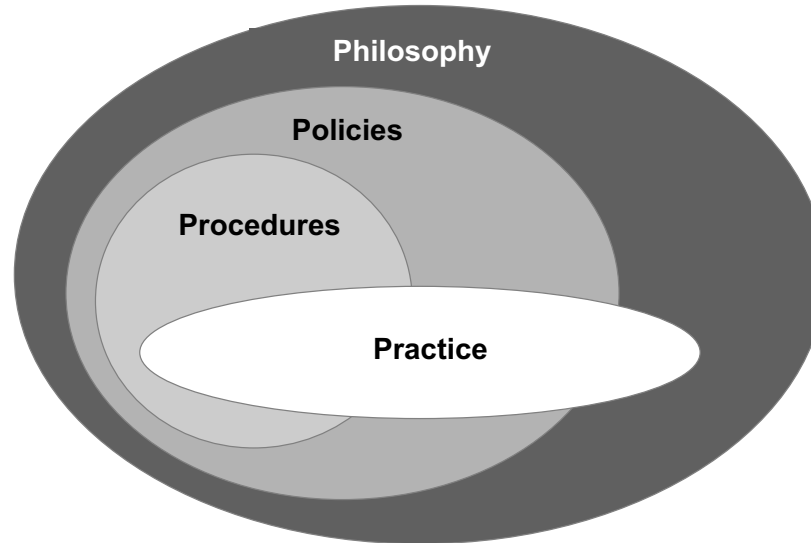




The 4P's

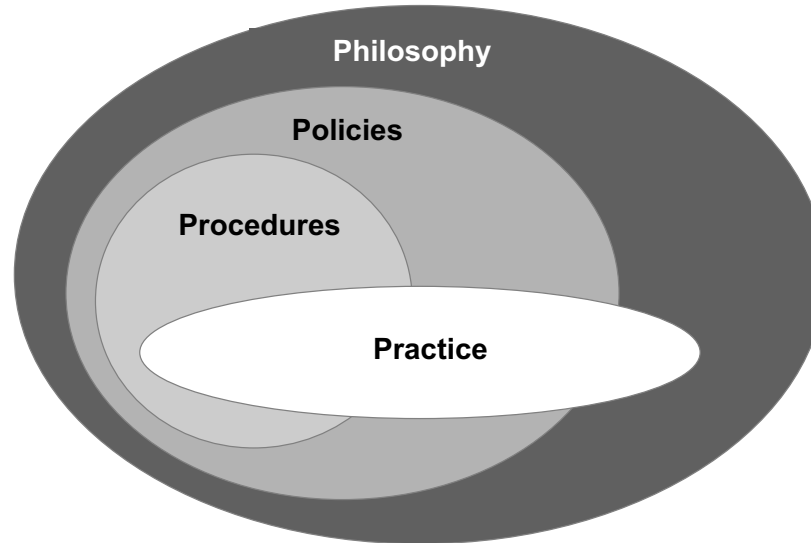


The 4P's



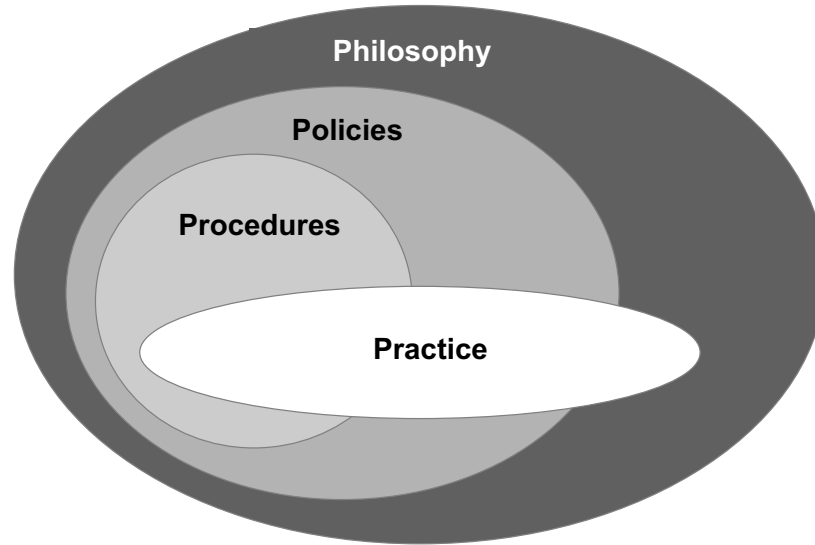
- Not a theoretical model.

The 4P's



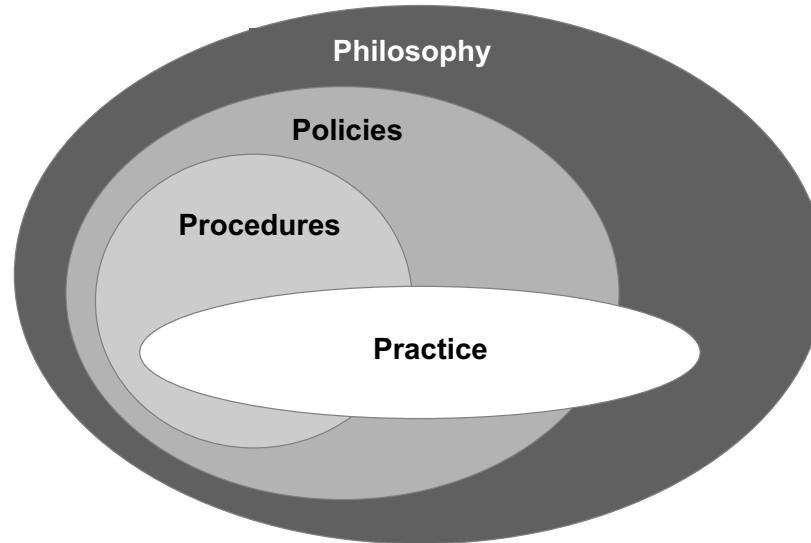
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The 4P's



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- That's the way it's out there right now.

The 4P's



- Not a theoretical model.
- The result of observations.
- That's the way it's out there right now.
- The question is whether you want to make it explicit or not.

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Designing Flightdeck Procedures

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Designing Flightdeck Procedures: Literature Resources

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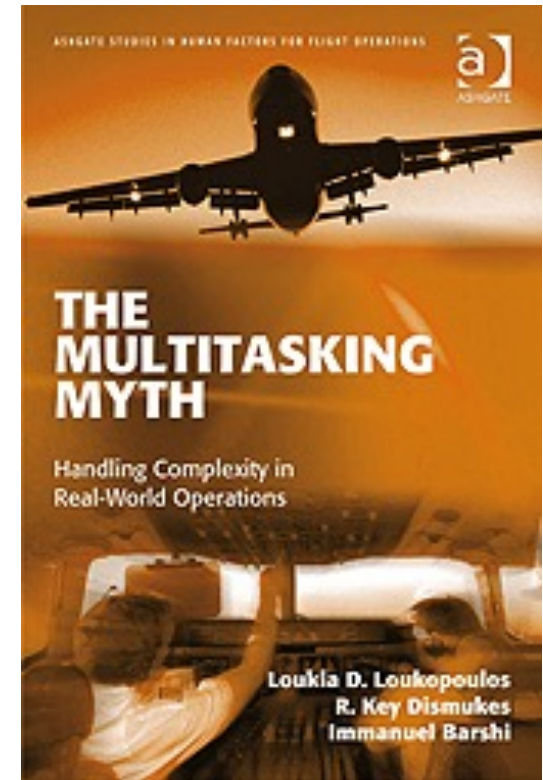
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