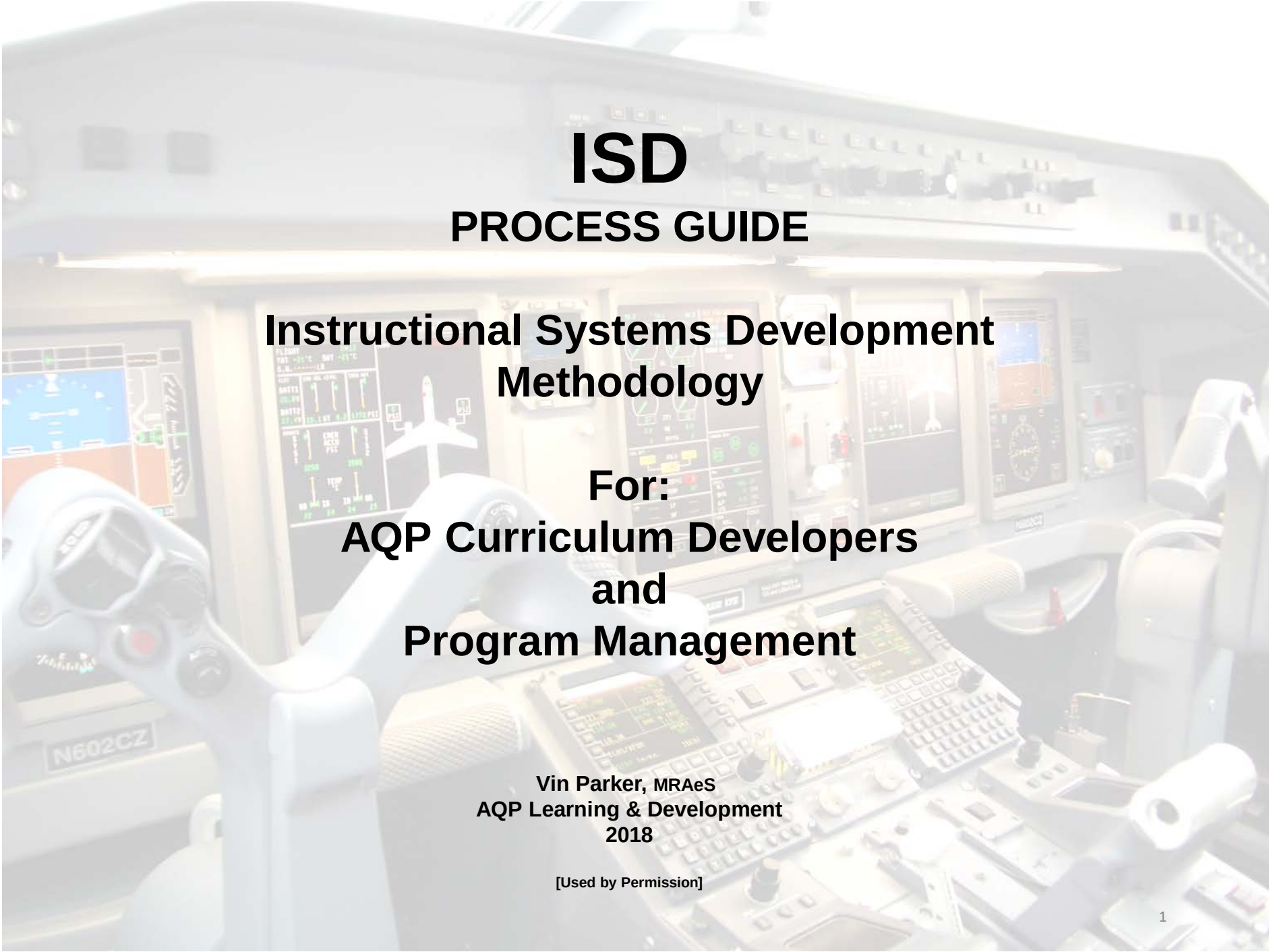


ISD

PROCESS GUIDE

Instructional Systems Development Methodology

For:
AQP Curriculum Developers
and
Program Management

Vin Parker, MRAeS
AQP Learning & Development
2018

[Used by Permission]

Instructional Systems Development Guide

ISD Guide Agenda:

- AQP-101 (brief refresher)
- ISD Process Overview
- ISD Process Considerations
  1) ISD Training Philosophy
  2) ISD Requirements
- ISD Methodology
- ADDIE Process Steps
  - ANALYSIS
    1) Training Needs Assessment (TNA)
    2) Content Needs Analysis (CNA)
  - DESIGN
  - DEVELOPMENT
  - IMPLEMENTATION
  - EVALUATION
  - REVISION
- ISD Documentation
- Considerations and Important Notes

AQP

‘AQP 101’

Refresher

AQP

Why AQP?

"AQP permits a greater degree of regulatory flexibility in the approval of innovative pilot training programs.

Based on a documented analysis of operational requirements, a certificate-holder under AQP may propose to depart from traditional practices with respect to what, how, when, and where training and testing is conducted."

- AC 120-54A

AQP

Goal of AQP

"The primary goal of AQP is to achieve the highest possible standard of individual and crew performance.

In order to achieve this goal, AQP seeks to reduce the probability of crew-related errors by aligning training and evaluation requirements more closely with the known causes of human error."

- AC 120-54A

AQP

Benefits of AQP:

- ✓ CRM – Integration of technical and behavioral skills
- ✓ Scenario-based – training and evaluation
- ✓ The ability to modify training curricula, media, and intervals
- ✓ Data-driven program improvement
- ✓ Crew evaluation as well as individual assessment
- ✓ Improved standardization across fleets and flight personnel
- ✓ Shift from programmed hours to proficiency-based training
- ✓ Access to innovative training ideas and research (industry)
- ✓ Opportunity to achieve more efficient training

AQP

Benefits of AQP:

FLEXIBILITY

AQP

Required Documents of AQP:

1. Application
2. Job Task List/Analysis (JTA)
3. Qualification Standards *(replaces 'Aircrew Certification Standards - ACS')*
4. Instructional Systems Development (ISD) Methodology
5. Implementation and Operations Plan (I&O)
6. Curriculum Outline(s)

Also:
Data and Program Reports

- FAA data submissions
- Periodic review(s)
- Annual (or end of reporting period)

Instructional Systems Development (ISD)

AQP - ISD
Development and Modification Process

Overview

Instructional Systems Development (ISD)

What is 'ISD' anyway?!

There are several **Systematic Training Program** methodologies (STPM) to choose from. The primary objective of a systematic program is to use *data-informed analysis* to develop – implement – and improve the program itself.

In AQP, Instructional Systems Development (ISD) – is the most commonly used systematic process for developing aviation training curriculums. However, ISD is also used and applied in many different industries and work settings – such as education, medical, military, even sports.

ISD uses adult learning theory, educational psychology, human factors engineering, and cognitive psychology (just to name a few of the disciplines that may support an ISD).

Quite simply: ISD is the methodology of how to develop and update training curriculums; how to deliver the training; and how to improve the training.

Instructional Systems Development (ISD)

What is 'ISD' anyway?!

In AQP, the ISD document itself is basically divided into two parts:

1) Curriculum Development
   Describing the approach for using JTAs and Qual Standards as a baseline to construct general training curriculums across all AQP courses.

2) Line Operational Simulation (LOS) Methodology
   Describing the approach for developing LOS scenarios

Instructional Systems Development (ISD)

ISD Regulations – Part §121 Subpart Y (900's)

The ISD process must be followed for '***developing or modifying Qualification Standards and associated Curriculum Content, based on using a documented analysis of the job tasks, skills, and knowledge required for job proficiency.'*** **[§121.907]**

'All AQP curriculums must be based on an instructional systems development methodology.'
[§121.909]

(…That's it!)

Instructional Systems Development (ISD)

ISD Process Overview

The ISD training development and modification process follows a basic step-development 'ADDIE' approach that includes the following components:

1 - ANALYSIS	4 - IMPLEMENTATION
2 - DESIGN	5 - EVALUATION
3 - DEVELOPMENT	6 - REVISION (*pro re nata*)

Instructional Systems Development (ISD)

ISD Considerations – for Development and Modifications

During the AQP development or modification process, two considerations must be applied to the overall objective(s):

1) Training Philosophy
2) ISD Requirements

Instructional Systems Development (ISD)

1. Training Philosophy

AQP training programs are designed to incorporate an adult education philosophy that supports positive learning and enrichment through coaching and measurable assessment of skills, knowledge, and behaviors. This philosophy also supports the use of multiple training mediums that may include, but are not limited to: distance learning through computer-based training (CBT); instructor-led (classroom); flight training devices (FTD) such as flat-screen and full-flight simulator (FFS) automation devices; and self-guided practice.

This approach includes data collection of specific task and behavioral performance to primarily identify areas for program improvement through trend analysis. Performance data analysis also may be used to identify opportunities for individual enrichment and professional improvement.

Instructional Systems Development (ISD)

Training Philosophy includes three elements:

1. Use of Advanced Qualification Program (AQP)
2. Training Objectives
3. Measurable Performance

Instructional Systems Development (ISD)

A. Training Philosophy – **Use of Advanced Qualification Program (AQP)**:

The first determination of a training philosophy is to simply declare the training will be centered within the AQP-ISD structure.

The AQP seeks to integrate the training and evaluation of task performance, knowledge, and cognitive skills at each stage of a curriculum. For 'pass/fail' purposes, crew members must demonstrate proficiency in scenarios that test both technical and crew resource management (CRM) skills together.

The AQP is designed to include data collection strategies which are diagnostic of cognitive and technical skills. Also implemented are procedures for refining curricula content based on quality control data.

Instructional Systems Development (ISD)

B. Training Philosophy – **Objective(s):**

The overall objective of training is to focus on continual enhancement of safety by achieving the highest possible levels of individual and crew performance. This is accomplished through data collection and trending analysis

Instructional Systems Development (ISD)

C. Training Philosophy – **Measurable Performance**:

Skills, knowledge, and behaviors are measured through an election of ratable tasks and behavioral indicators. Performance outcome and areas for program improvement are determined through a combination of data-driven inputs, from a range of internal and external data source programs.

Internal data inputs include AQP performance data, as well as operational data (i.e., ASAP, FOQA, LOSA, Line Check, et cetera.).

External data inputs may include published FAA documents, industry trending, and *substantiated* expert opinion.

Instructional Systems Development (ISD)

2) ISD Requirements

1. Develop a job task listing.
2. Analyze that listing to determine essential skill and knowledge requirements (either directly or by reference). This becomes a Job Task *Analysis* (JTA)
3. Determine which skill and knowledge requirements must be trained/tested.
4. Develop proficiency objectives that capture all training requirements.
5. Develop qualification standards that define acceptable operational performance levels.
6. Develop tests that measure proficiency in skill and knowledge areas.
7. Provide instructional programs that teach and test training requirements.
8. Establish and maintain an audit trail of explicit links between task requirements, training requirements, training and evaluation activities, and evaluation results.
9. Measure student performance against proficiency objectives and qualification standards for all curriculums.
10. Revise the training program based on student performance levels on an ongoing basis. This de-identified data (stored in the Performance/Proficiency Database) will be collected and reported to the FAA on a regular basis.

Instructional Systems Development
(ISD)

Methodology

Instructional Systems Development (ISD)

ISD Methodology

The AQP instructional systems development (ISD) methodology is a systematic process of developing training curriculum and follows an ADDIE step-development ISD model.

Each step of the ISD development, including the order of its application may be modified or arranged to meet the needs of the training objectives.

Instructional Systems Development (ISD)

The most complex AQP curriculums developed are those designed for pilot training, so the descriptions and examples in most training documents are based primarily on the development and maintenance of the pilot courses.

Therefore, the pilot procedures and methodologies will typically apply to the development of all AQP curriculums, unless otherwise noted.

Other course development methodologies may differ from the pilot course methodologies, and will be described by exception. Such as those for instructors or evaluators, etc.

ISD Process

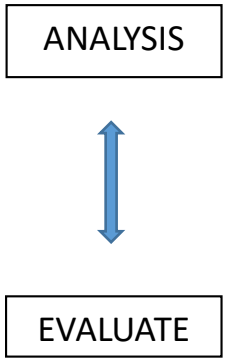
Using the ADDIE Process Steps

The ADDIE process (Analysis – Design – Development – Implementation - Evaluation) generally follows a linear process, particularly during initial curriculum development.

The general activities associated with each of the ADDIE steps should always be considered for any development or modification, but may not always apply, depending on the activity content or application.

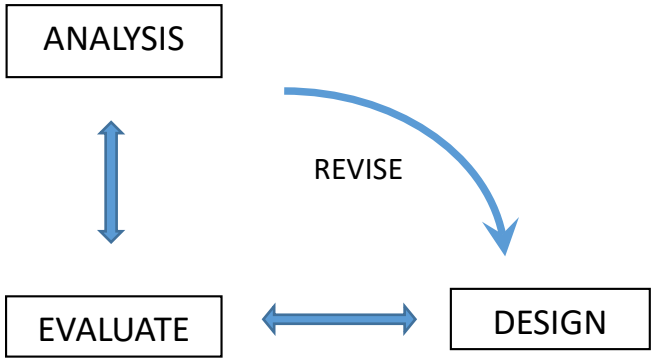
ISD Process

ISD
ADDIE Process



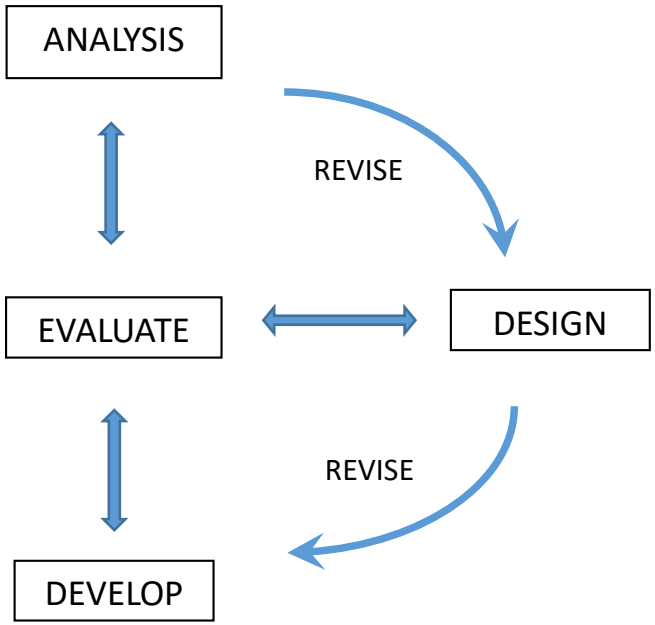
ISD Process

ISD
ADDIE Process

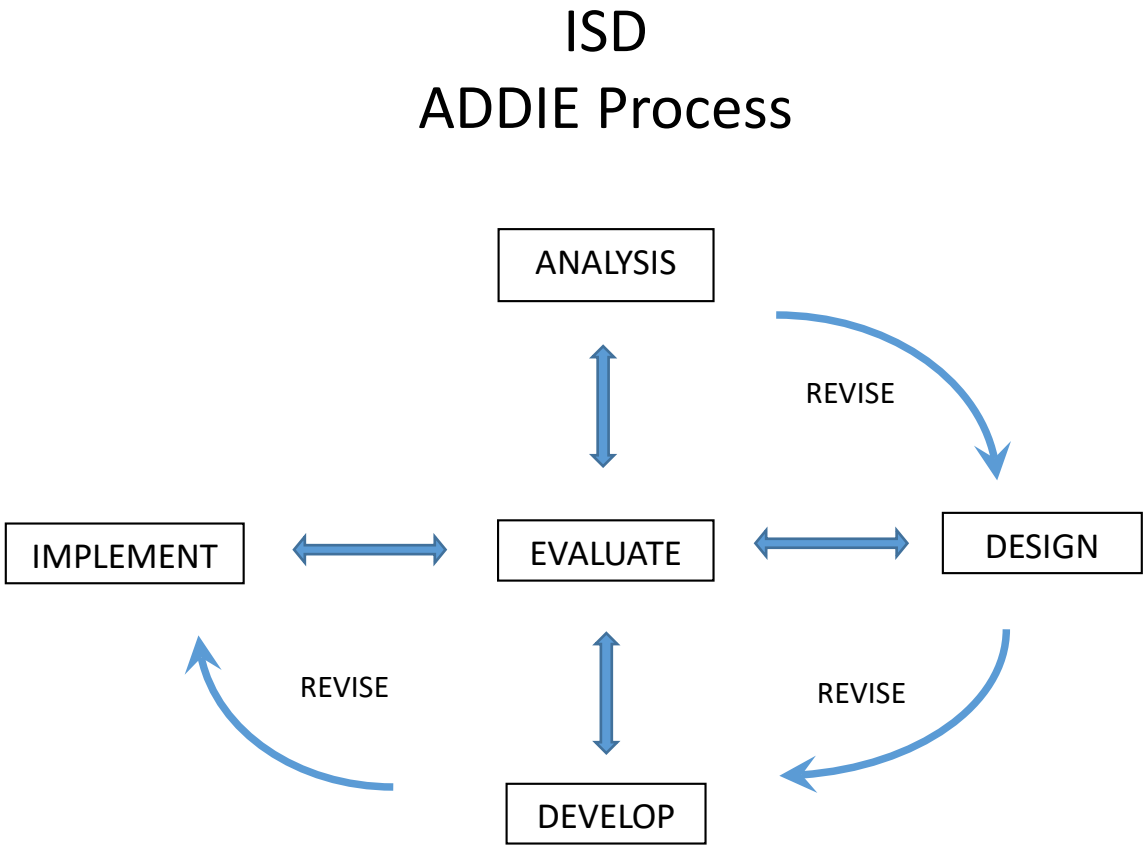


ISD Process

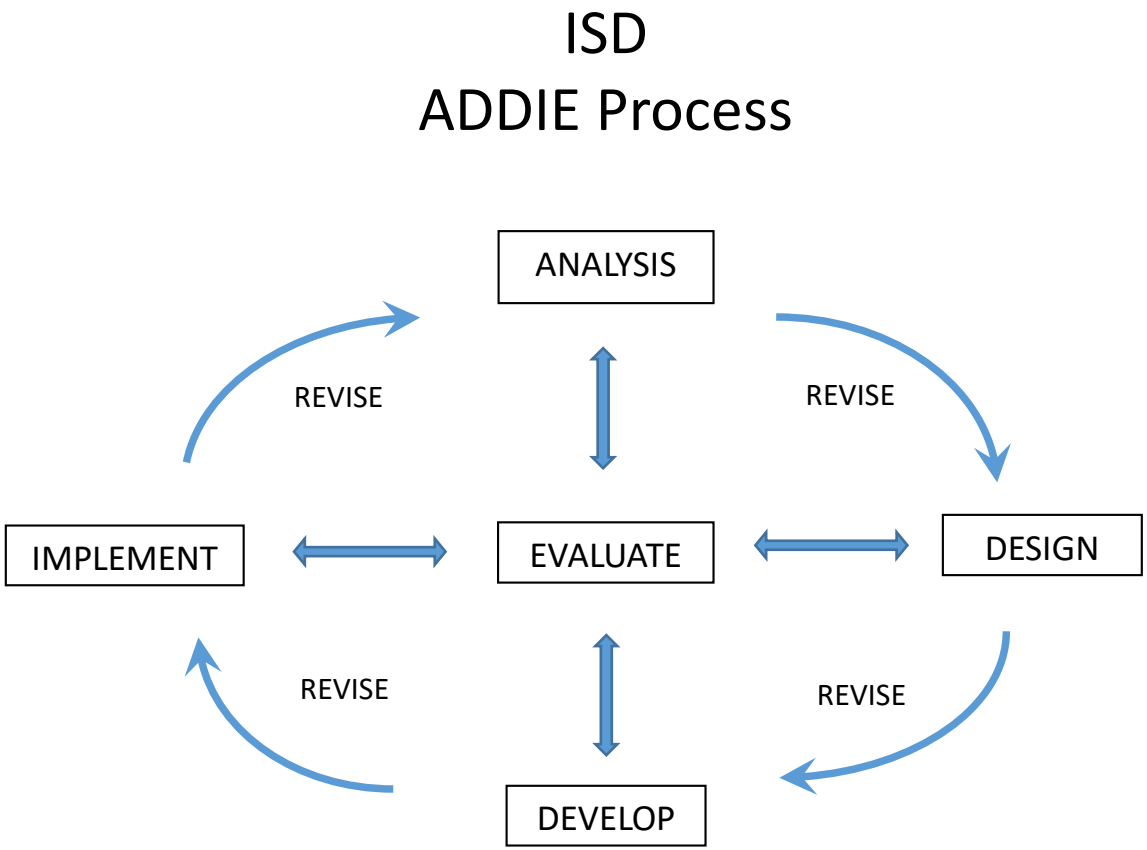
ISD
ADDIE Process



ISD Process


ISD
ADDIE Process
ANALYSIS
REVISE
IMPLEMENT
EVALUATE
DESIGN
REVISE
REVISE
DEVELOP

ISD Process


ISD
ADDIE Process
ANALYSIS
REVISE
REVISE
IMPLEMENT
EVALUATE
DESIGN
REVISE
REVISE
DEVELOP

ISD Process

ANALYSIS

The analysis phase of the ISD process includes two parts:

Part 1: Training Needs Assessment (TNA)
Part 2: Content Needs Analysis (CNA).

ISD Process

ANALYSIS – Part 1: Training Needs Assessment (TNA)

The analysis process must first identify the need (or problem), and determine if a desired result outcome would be achieved through a training solution. This is determined by completing a Training Needs Assessment (TNA).

In many cases, a problem or objective may not require a training solution or modification to achieve a resolution. Therefore, a TNA must first be conducted to determine if the applicable data analysis indicates a genuine need for training. If the TNA process determines there is a need for training, analysis steps are required to determine the specific task and behavior objectives to support design and development.

ISD Process

ANALYSIS – Part 1: Training Needs Assessment (TNA)

PRACTICAL APPLICATION

When the only tool in your toolbox is a hammer, every problem looks like a nail.

When your only area of influence is training, every human performance shortfall looks like a training issue. But human performance has at least six components. Unless this shortfall consists of a lack of skill and knowledge, and nothing other than a lack of skill and knowledge, then there may be more to the solution than training, if training is even part of the solution at all!

ISD Process

ANALYSIS – Part 1: Training Needs Assessment (TNA)

PRACTICAL APPLICATION

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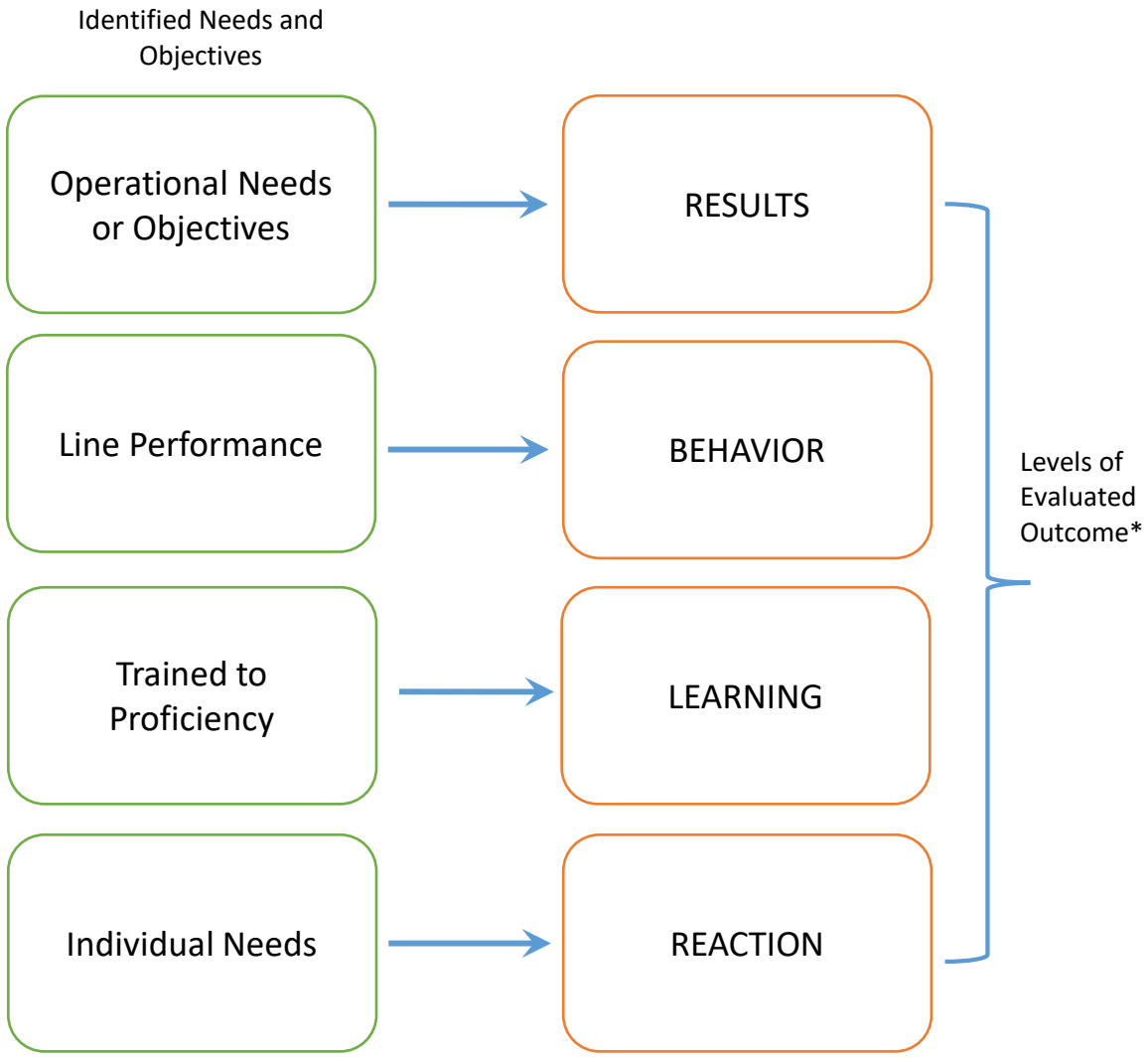
-Dr. Doug Farrow
AQP Program Manager, FAA AFS-280 (ret.)
'Human Performance Technology, ISD'
FAA Memo, 2001

ISD Process

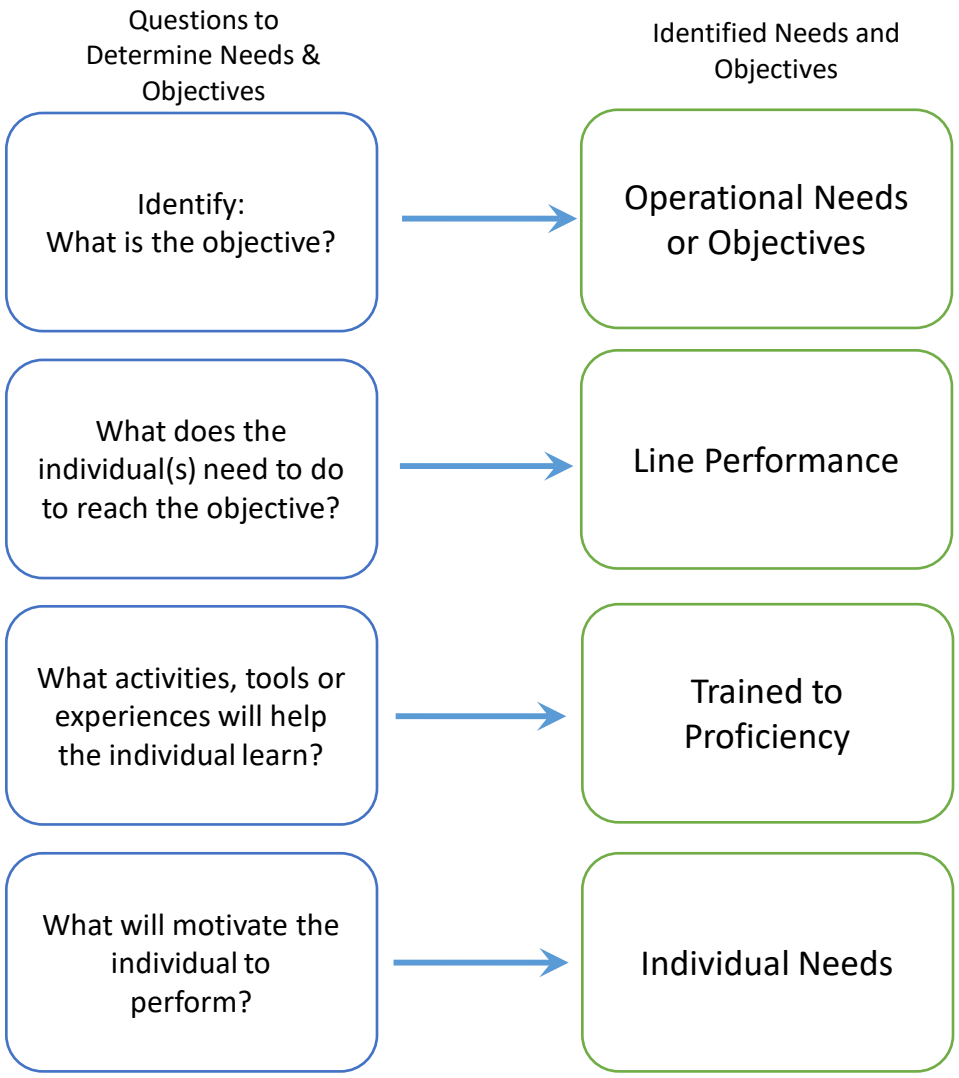
Which level of evaluated outcome applies? (if any)

How do I determine Needs and Objectives?



*Kirkpatrick's Levels of Evaluation

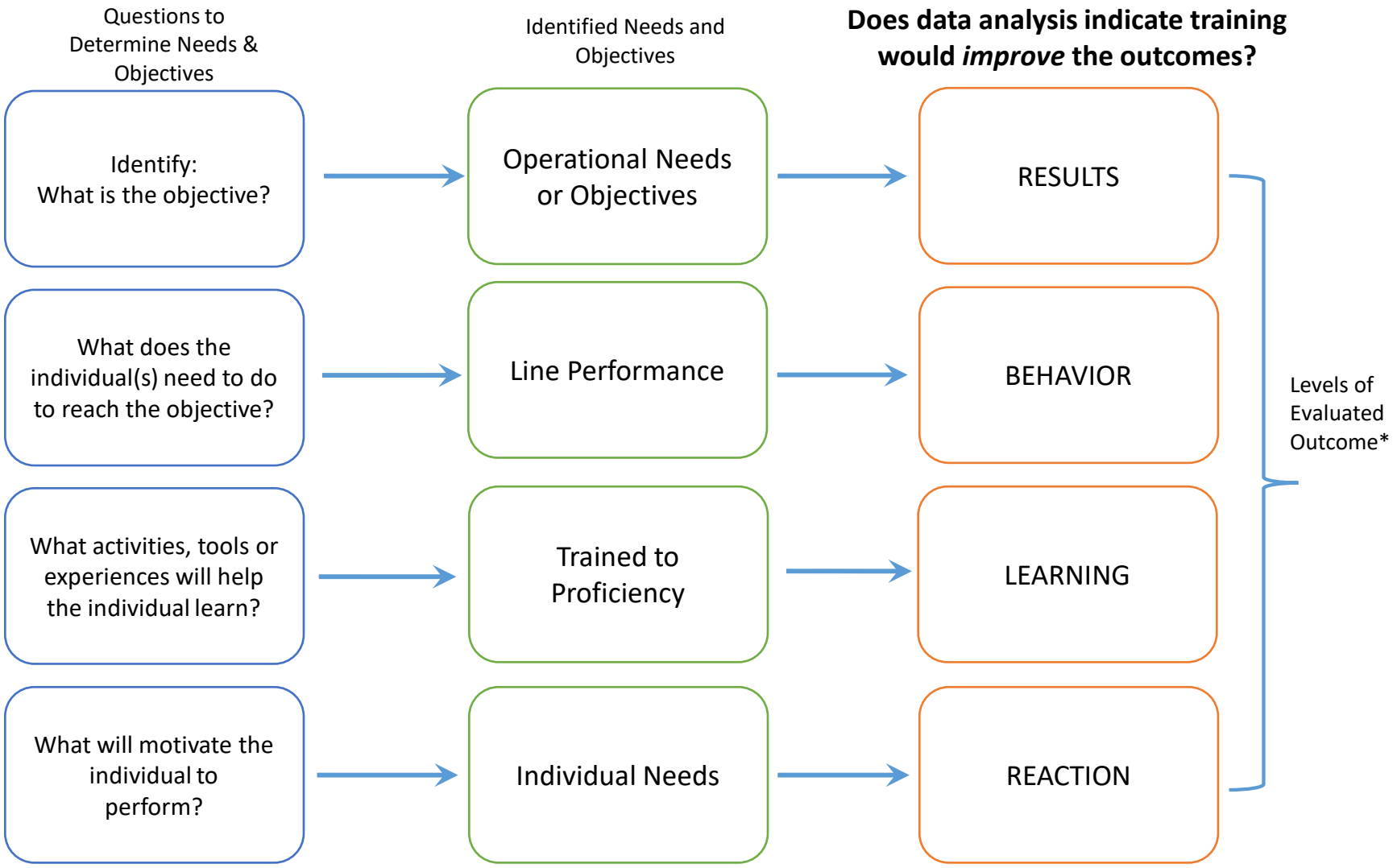
ISD Process



Questions to Determine Needs and Objectives

ISD Process

Training Needs Assessment (TNA) Process



*Kirkpatrick's Levels of Evaluation

ISD Process

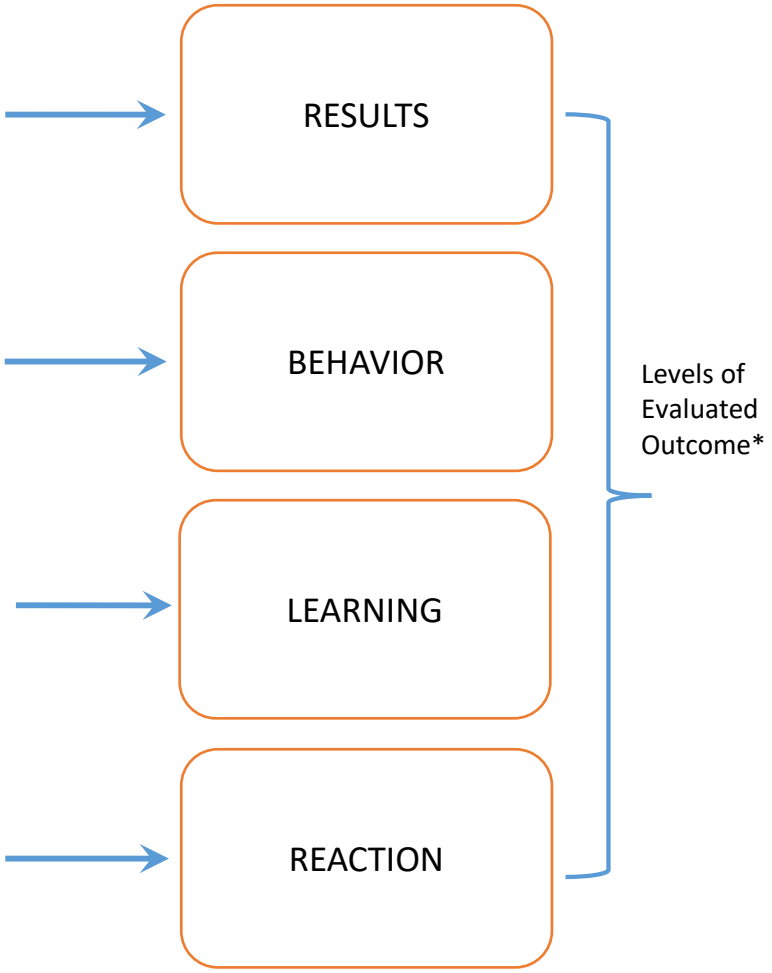
Does the *data analysis* indicate that…

… a training solution would achieve the *operational* outcome or results?

… a training solution would provide what they need to do to reach a *behavior* objective?

… a training solution would provide the activities, tools, or experience they need to *learn*? (training)

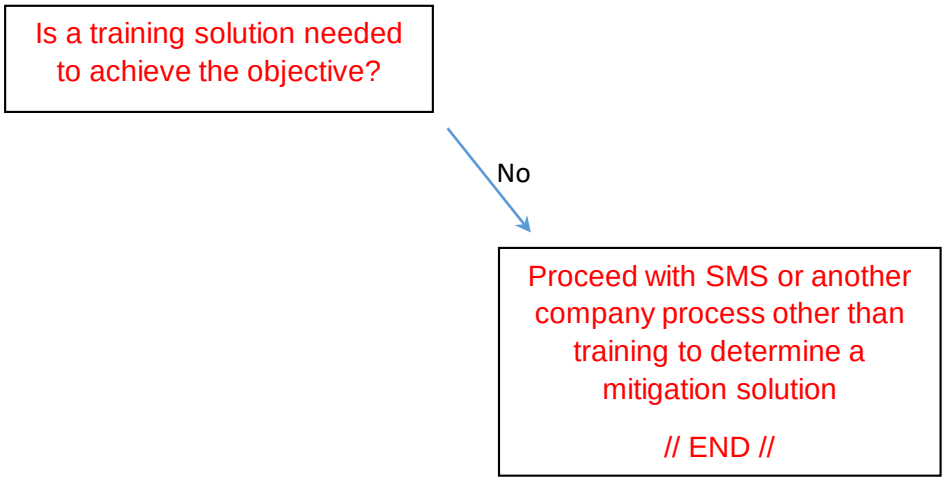
… a training solution would provide the *motivation* to learn?



*Kirkpatrick's Levels of Evaluation

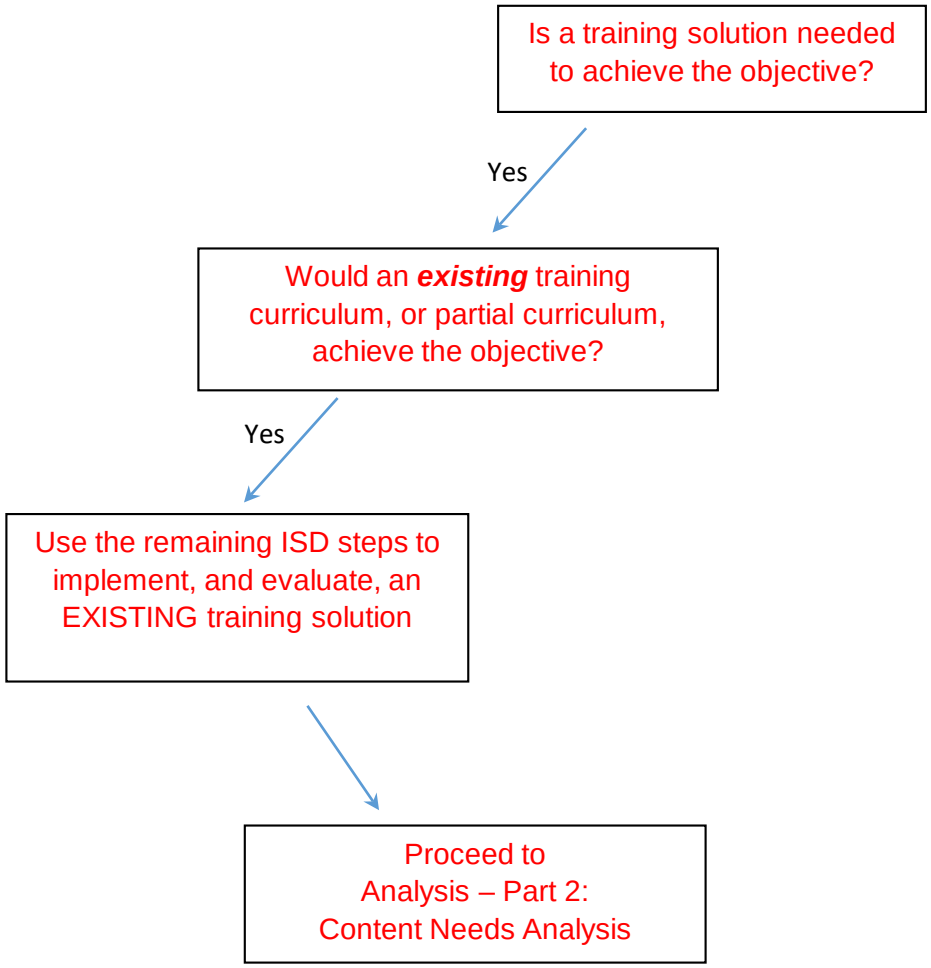
ISD Process

Training Needs Assessment – Conclusion Flow Chart



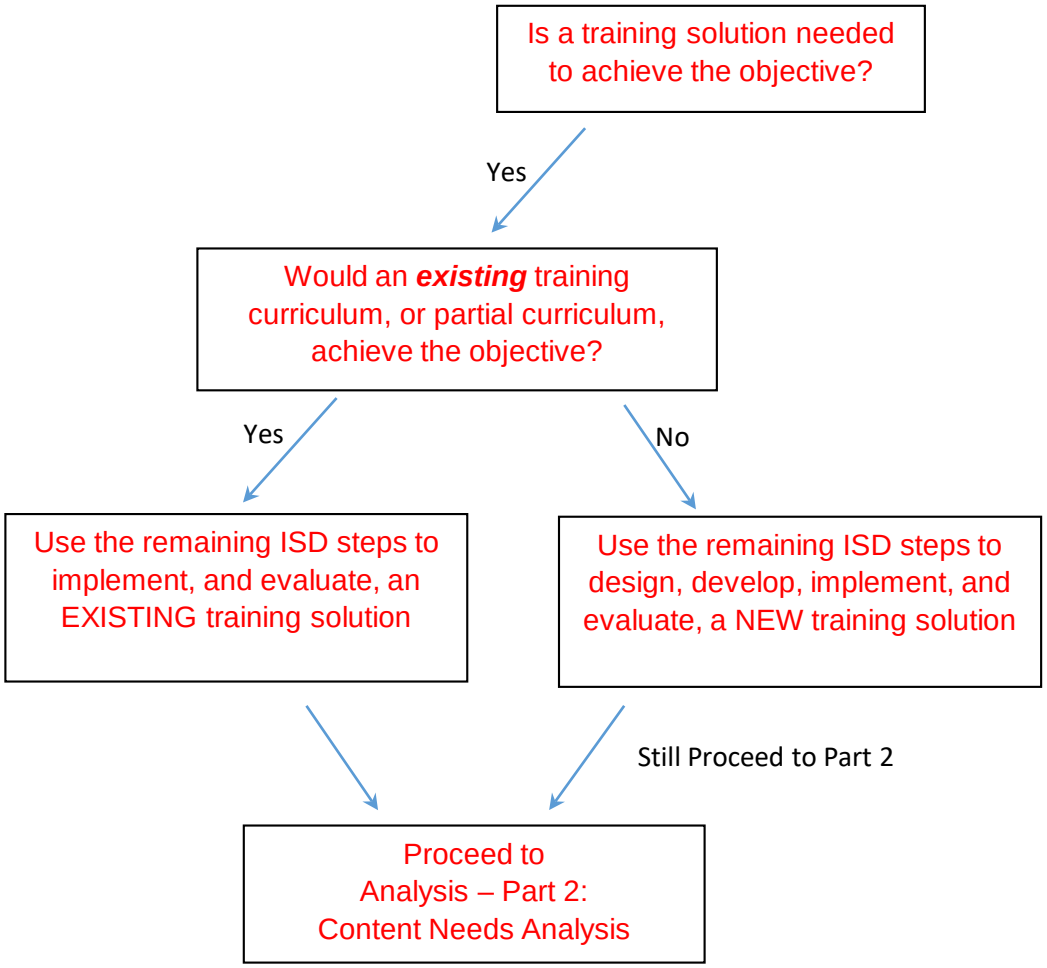
ISD Process

Training Needs Assessment – Conclusion Flow Chart



ISD Process

Training Needs Assessment – Conclusion Flow Chart



ISD Process

ANALYSIS – Part 2: Content Needs Analysis

The Content Needs Analysis (CNA) is used to determine specific measurable tasks or behaviors that may be used within a training curriculum. The CNA process also identifies the requirements of specific task factors, such as currency and criticality, as well as Qualification Standards, demographics and media considerations. The CNA provides the building blocks for the remaining design and development process

ISD Process

Use the following items to complete a CNA:

- ❑ Develop or identify a job task listing
- ❑ Analyze job tasks to determine component or prerequisite skills and knowledge for each job task
- ❑ Examine student demographic data and perform instructor/evaluator assessments to determine which skills and knowledge will be trained and/or tested in each curriculum
- ❑ Develop or identify proficiency objectives (TPO), to include the specification of real-world conditions and standards, for all tasks, subtasks, and CRM components, as well as higher-level elements, where appropriate
- ❑ Develop or identify enabling objectives (EO), to include the specification of academic conditions and standards, where appropriate, for CRM components, behaviors, elements, and for skills and knowledge, as required
- ❑ Assess criticality, currency, media requirements, and evaluation strategy for proficiency objectives, as required
- ❑ Develop or identify Job Task Analysis and Qualification Standards documents for each duty position

Proceed to the next ISD Steps…

ISD Process

DESIGN

- ❑ Allocate proficiency objectives among major AQP curriculums: Indoctrination, Qualification and Continuing Qualification.
- ❑ Append enabling objectives to their parent proficiency objectives.
- ❑ Cluster and sequence objectives into lessons according to media and method considerations.
- ❑ Cluster and sequence lessons into modules, modules into segments, and segments into curriculums.
- ❑ Develop a Curriculum Outline for each major AQP curriculum.
- ❑ Design the performance data collection and analysis system to support crewmember, instructor and evaluator performance.

ISD Process

DEVELOPMENT

- ❑ Develop teaching and testing materials, activities, events and data collection forms for crewmember, instructor and evaluator curriculums.
- ❑ Develop the data collection and analysis system.
- ❑ Train instructors and evaluators, using Instructor and Evaluator AQP curriculums, to train and evaluate crewmember AQP curriculums.
- ❑ Conduct small group tryouts (SGT) of crewmember curriculums.
- ❑ Collect and analyze SGT student performance data.
- ❑ Report de-identified SGT data to the FAA.
- ❑ Revise materials, activities, events, and the data collection and analysis system as applicable. Conduct additional small group testing, if required.

ISD Process

IMPLEMENTATION

- ❑ Implement curriculums for all crewmembers, instructors and evaluators.
- ❑ Collect and analyze performance data on all students, instructors and evaluators.
- ❑ Report de-identified data to the FAA.
- ❑ Revise materials, activities, events, and data collection and analysis system as applicable.

ISD Process

EVALUATION

- Assessment and review all analyses, processes, products, data, reports and activities completed as part of the analysis, design, development and implementation activities.
- Analysis and review of all performance data on crewmembers, instructors and evaluators.

ISD Process

REVISION (*pro re nata*)

- The revision process is incorporated as necessary, at any stage, throughout the ISD process.

REVIEW - EVALUATE - REVISE

ADMINISTRATIVE

Instructional Systems Development (ISD)

2) ISD Requirements

1. Develop a job task listing.
2. Analyze that listing to determine essential skill and knowledge requirements (either directly or by reference). This becomes a Job Task *Analysis* (JTA)
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Instructional Systems Development (ISD)

2) ISD Requirements

8. Establish and maintain an audit trail of explicit links between task requirements, training requirements, training and evaluation activities, and evaluation results.

Instructional Systems Development (ISD)

ISD Process Documentation

Throughout the ISD process, documentation of the ISD process should be maintained to ensure each step of the ISD was followed. In some cases, the order of the step process, or specific step elements may vary, depending on the development or modification needs.

The ISD process may be conducted within, or as, an SMS safety risk management process. In those cases, documentation of the ISD process may exist within either the training documents, or the SMS documentation system.

Documentation of the ISD process supporting AQP curriculum development and modification may be internal to the organization and is not necessarily required for external publication or FAA submission, beyond the normal AQP communications.

However, ISD process documentation should accompany FAA submissions for development or modifications of Qualification Standards or Curriculum Content . ISD process documentation may also be used to support any other development or modifications, as needed, at the discretion of the training management.

Instructional Systems Development (ISD)

ISD Process Documentation

SUMMARY:

In most cases it will be prudent to document the specific actions and steps taken as a record of the ISD process.

This helps the organization reference how qualification standards or a certain element of curriculum content - was created, or changed.

When appropriate, ISD Process documentation should also be included as support documentation for certain FAA approval submissions.

Instructional Systems Development (ISD)

NOTES:

Program managers, curriculum, and courseware developers should use the ISD ADDIE process steps in the order outlined to develop and/or modify the Qualification Standards or Curriculum – unless otherwise appropriate.

It is important to understand that the ISD process doesn't end after the initial curriculum development process. AQP is a continually improving program and the ISD process must be used throughout the life span of each AQP curricula.

The ISD step development process is intended to be flexible. Not all steps or items listed are intended to be all-inclusive, nor does every step or item listed necessarily apply to every program or curriculum development or modification. In many cases, minor adjustments, concepts, or changes may occur through subject matter expert (SME) discussions or development activities. The intention of the ISD methodology and development step-process, is to provide a familiar guideline for developers to follow, and ensure consideration of data-driven improvements to the AQP.

Questions?

Vin Parker, MRAeS
AQP, Learning & Development
Pilot and FA Training Programs

NEXT:

LOS

Development and Modification