CAE

COUNCIL FOR HUMAN PERFORMANCE EXCELLENCE

Designing with Learners in Mind: Increasing Learning Effectiveness

Confidence through smarter training

Introduction

- The main objective of flight training is to impart learning in a safe, efficient and effective manner as possible.
- However, we always seek opportunities to improve and this article will address some of the improvements possible.

Teaching: Ideas or principles delivered by an authority.

Learning: The acquisition of knowledge or skills through an experience.

Research

CAE's Council for Human Performance Excellence (hpX) surveyed the instructor cadre to ascertain the state of human performance knowledge and it's application within all areas.

Results included a general desire to increase:

- Understanding of human behavior,
- Leadership and
- Threat and Error Management

Human Behavior

- Behavioral Science is the study of why people do what they do, which is fundamental to learning. It includes the behavior of individuals or groups, and considers how our individual differences, thoughts, feelings, and learning history shape the way we behave.
- If we can harness the power of human behavior, then achieving learning becomes easier!

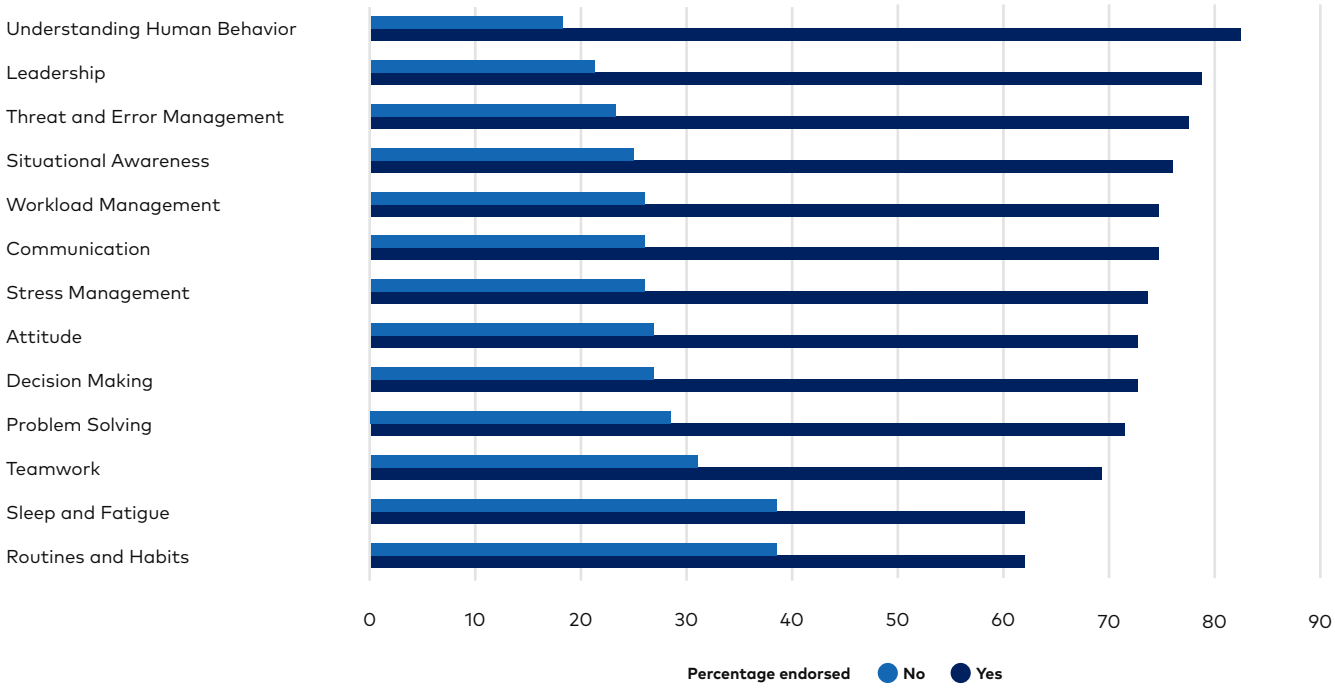

Figure 1: Which elements of CRM and human performance would you like a better understanding of?

Instructor Led Teaching vs Learner Centric Design

Teaching has been traditionally instructor led, resulting in two main teaching approaches:

- 'Stick' method: students strive to succeed to avoid physical or emotional punishment.
- 'Carrot' method: students strive to succeed for positive rewards

No matter which of these two methods we consider, teaching is still most often seen as something done by the teacher.

A third option is student-led learning, or **Learner-Centric** teaching.

Learner-Centric Methods

Facilitation is an important instructional skill that takes time to develop and refine.

However, not all learning can be purely facilitated: Many technical elements will need a more traditional approach to learning to establish key ideas before moving to other methods.

- Many other learner-centric methods can be used, but these elements cannot be designed, developed, and resourced without considerable preparation within an *instructional design framework*.
- Therefore, instructional design plays a key role in improving learning.

Facilitation: An active training method using effective questioning, listening and a non-judgmental approach.

Figure 3: Move towards Learner Centric Methods

Instructor-Centric Teaching

- Knowledge delivered instructor to student
- Instructor is primary deliverer and assessor
- Learners receive information passively
- Emphasis on memorizing knowledge
- Separate instructing and assessing
- Assessment is used to measure learning
- Should know the 'right answers'
- Focused on single topic
- Individualistic culture among learners

Learner -Centric Teaching

- Learner integrates information with critical thinking
- Instructors and learners learn & evaluate together
- Learners are actively engaged and involved
- Emphasis on applying knowledge in real life
- Interwoven instructing and assessing
- Assessment is used to promote learning
- Should learn from mistakes
- Interdisciplinary and whole task learning
- Supportive, collaborative, and cooperative culture

Figure 2: Huba and Freed (2000) compare Instructor and Learner Centric Teaching[1]

1. Huba, M.E. and Freed, J.E., 2000. Learner-centered assessment on college campuses: Shifting the focus from teaching to learning. Allyn & Bacon, 160 Gould St., Needham Heights, MA 02494.

Instructional Systems Design

- The ADDIE model is currently used by our Instructional Systems Designers (ISDs) and is a basis for all CAE courseware design, as per the EASA and UK CAA publications[2]. ICAO also describe a similar process in PANS-TRG[3].
- Unfortunately, most courses still result in scrap learning: when content delivered is not later applied by the learner in their role.
- There is some merit to the extra content within scrap learning; it can sometimes be useful to some students. It can broaden learning or give insights for the more able students.

However, scrap learning should be reduced for several reasons:

- It uses expensive resources to develop and teach.
- Students often fixate on scrap learning.
- It can overwhelm the essential learning.
- Mixing essential and non-essential content leads to misconceptions.

The ADDIE method to fully reflect an understanding of the surrounding systems, behavioral and learning sciences.

2. Organization Requirements for Aircrew (Part-ORA) Annex VII to Regulation (EU) No 1178/2011
3. ICAO Doc 9868 PANS-TRG

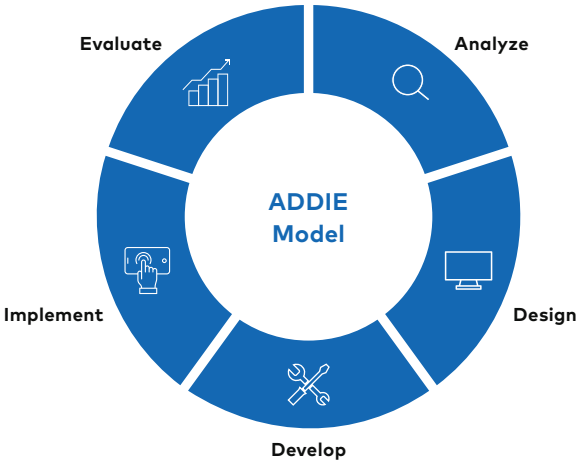

Figure 4: The ADDIE Model

Improvements

An improved CAE ISD framework will include a full **Behavioral Systems Analysis (BSA)**, including:

- additional analysis - before the formal ADDIE process,
- extensive evaluation - matching with education levels above and below,
- continuous improvement - complete the cycle and inform course updates.

1

Outcomes and Objectives

Decision-making phase that will determine and describe the purpose, scope, audience and potential performance improvement criteria.

2

Receiving Systems

Analysis of the existing system support that may inform the project or have an impact on its performance.

3

Agree Performance Specifications

Decide on how performance specifications will be identified and agree on the specifications themselves.

4

Corresponding Method Selection

Choice of methods of instruction, delivery, and assessment based on a learner-centric approach.

5

Content Design and Development

List content and design the way/ order it will be delivered and ensure content is critical to the performance environment thereby reducing superfluous content.

6

Evaluation and Continuous Improvment

Efficacy and impact evaluation for the deliverables and a plan for continuous improvement.

Human Performance Guide

The human performance guide will be available through CAE 360 and Airside, and will be released by chapter, across 4 sections:

Section 1. Explains the basics of human behavior and how that fits within CRM, HF, Competency-Based Training and Assessment (CBTA) and Evidence Based Training (EBT).[4]

Section 2. Describes and explains each of the social and cognitive ICAO competencies and discusses how these can be demonstrated and observed.

Section 3. Gives real life examples and application of the competencies and develops techniques to aid in the progression from copilot to command.

Section 4. A fourth level will be contained in the Instructor Companion Document, to combine CBTA and the Instructor Evaluator and Assessor Competencies (IECs)[5].

Within this guide, CAE will:

- define human performance language and guide the conversation to increase aviation safety.
- create a shared understanding of human behavior, CRM, and learner-centric design,
- research the effectiveness of the adapted ISD framework.

The guide will address three specific areas of need:

1. Support our instructors and respond to feedback from the human performance survey.
2. Increase effectiveness of our training services by challenging outdated or ineffective concepts.
3. Deliver thought leadership across CAE business sectors and the aviation industry.

4. ICAO Doc 9995 Manual of Evidence Based Training
5. IATA Guidance Material for Instructor and Evaluator Training

Look out for our chapters being launched on Airside from March 2022!