

# Training Management System – The Missing Link

J. (Jay) Bahlis, Ph.D., P. Eng.  
BNH Expert Software Inc.  
4000 Steinberg Street  
Montreal, Quebec, Canada H4R 2G7  
[www.bnhexpertsoft.com](http://www.bnhexpertsoft.com)  
1 (514) 745-4010 x 21  
[bahlis@bnhexpertsoft.com](mailto:bahlis@bnhexpertsoft.com)

## Abstract

Over the past two decades, the focus of training systems has been on learners. These included Learning Management Systems (LMS) to manage the training requirements of learners and track their progress; Talent Management System to manage competency requirements and facilitate succession planning; Assessment/Readiness Systems to ensure that learners acquire the necessary knowledge, skills and competencies; and so forth. In other words, to ensure that learners are doing things right.

The underpinning assumptions for these systems are:

- a. Competencies that learners need are aligned with organization/operational requirements;
- b. Training activities that learners are undertaking are aligned with duties, roles and responsibilities;
- c. Training delivery is effective and efficient – i.e., only includes activities that add value, uses the most cost effective technologies; and maximizes the use of personnel and resources.

These assumptions are, however, highly optimistic since: (a) training analysis, design, development, implementation and evaluation (ADDIE) are often performed by different groups/commands; (b) access to up-to-date data is difficult since exchange is typically linear and formalized; (c) impact of mission, system, job and policy changes on training activities are time consuming to assess since data is not stored in centralized relational database; (d) feedback from operational units on learners' performance is lagging, and so forth. In other words, although we may be doing things right, we may not be doing the right things.

Training Management Systems can resolve most issues by storing operational and training requirements in a centralized relational database, that can be accessed anytime and from anywhere by all team members. Moreover, Training Management Systems can provide the necessary inputs to all learner centric systems to ensure that not only are they doing things right, but are also doing the right things!

## Biography

J. (Jay) Bahlis, Ph.D., P. Eng. is the president of BNH Expert Software. Lead the training analysis of multiple large scale military projects; assisted dozens of organizations in developing effective and efficient training strategies, and aligning training with missions/goals; evaluated several eLearning technologies; directed research on adult learning theory; and managed the design/development of the Training Management System ADVISOR Enterprise. Dr. Bahlis is the author of "Technologies in Distance Learning and Workplace Training" Guide and "From Classroom to Boardroom – Strategies to Maximize Impact of Training" booklet. He holds a Doctorate in Engineering and Applied Mechanics from McGill University.

## Doing More with Less

Training organizations are under continuous pressure to transform, optimize and modernize training to meet increasing demands with limited resources, while preserving training effectiveness. In other words, continually improve training efficiency. To achieve this goal, most have focused on training technology innovations – i.e., use synchronous or asynchronous learning in lieu of instructor-led for academic topics as means of reducing travel and instructors costs; desktop, part-task, full-task, or full-mission simulators to practice skills while reducing the wear and tear on expensive equipment; gaming, augmented and virtual reality for team building exercises and so forth. Although training technology is and will continue to be a key part of the training solution; critical and more fundamental issues that significantly impact training efficiency – such as training duplication, gaps and overtraining – are being overlooked. The aim of this paper is to highlight how these issues can be uncovered, as well as how to resolve and avoid them.

## How to Identify Training Inefficiency

The primary objective of training is to supply qualified, organization ready individuals. This implies that the training should develop the Knowledge, Skills and Attitudes (KSA) (or competencies) needed by each individual to perform their job. Training of pilots, for example, should focus on developing the KSAs needed to fly the aircraft under various conditions; training for technicians should focus on developing the KSAs needed to maintain and troubleshoot relevant equipment; training for drivers and gunners should focus on relevant vehicles and guns, and so forth. In other words, training activities that support specific operational requirements are needed.

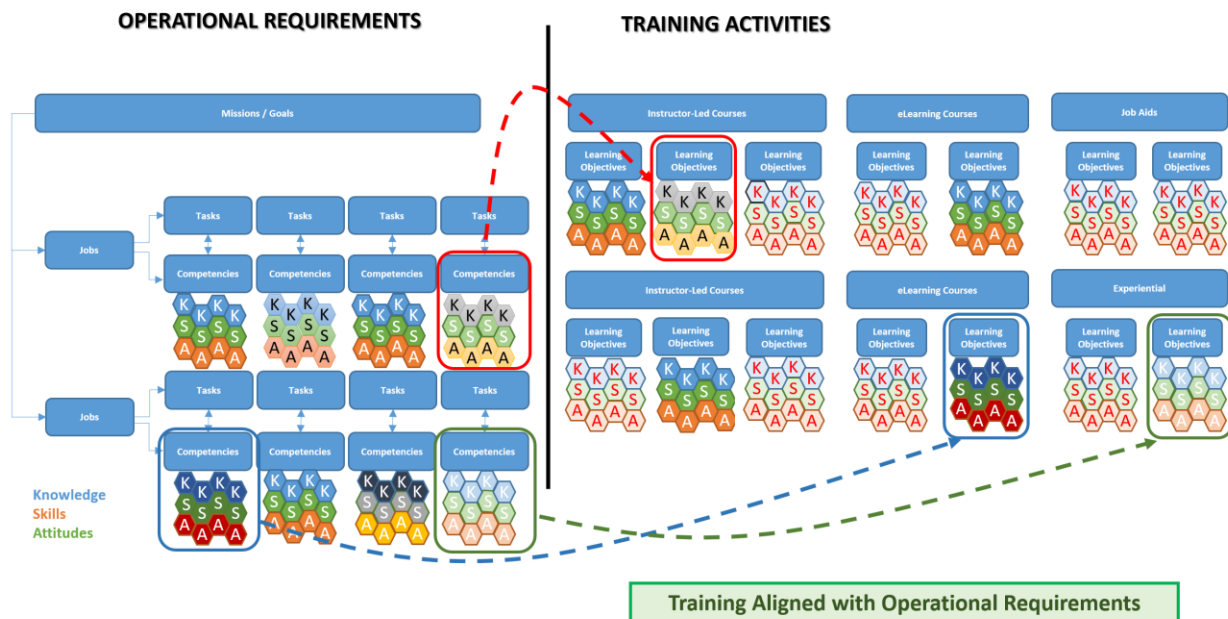


Fig 01. Training Activities Aligned with Operational Requirements

In many instances, similar KSAs are needed to perform multiple tasks, or similar tasks are performed by multiple jobs. For example, how to operate and maintain similar internal and external communication systems onboard several navy platforms.

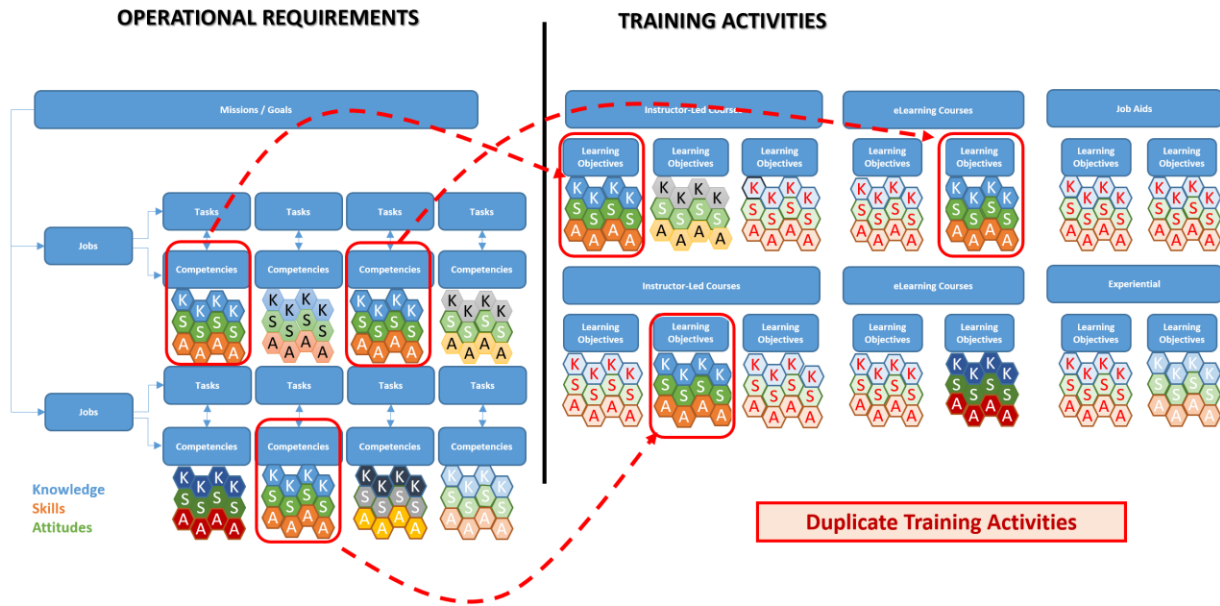


Fig 02. Duplicate Training Activities

Since the KSAs in these cases, are similar, a single training activity is needed to address all requirements in lieu of multiple. By uncovering unintentional duplications, in addition to minimizing the time and cost needed to develop, update and maintain training, time to competency can be reduced while improving consistency.

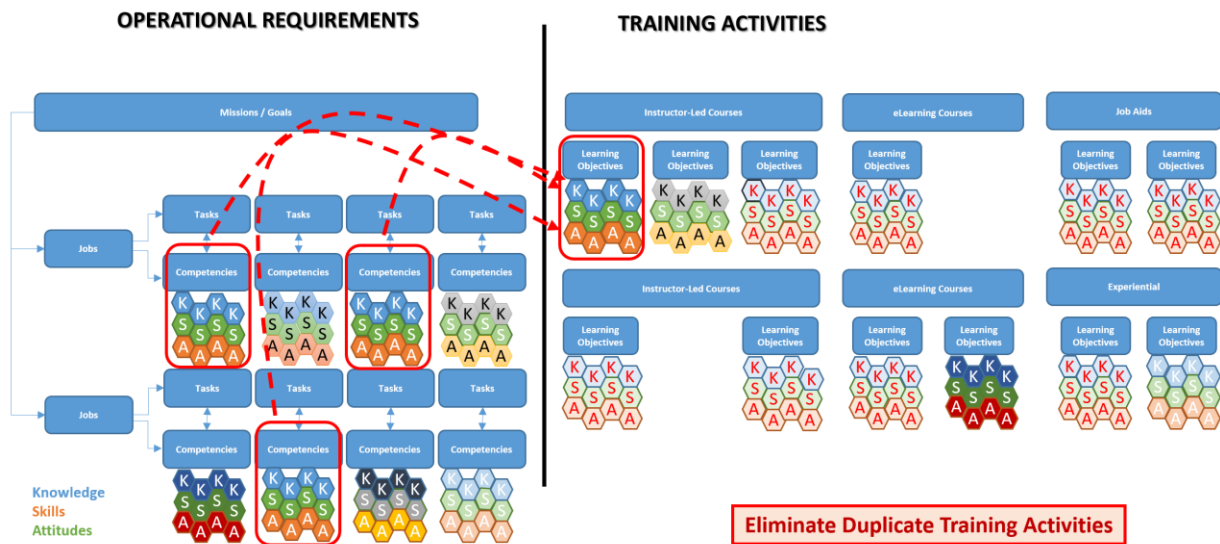


Fig 03. Minimize Training Duplication

In some cases, missions, systems, jobs, policies and/or references may have been modified, but the training has not been updated.

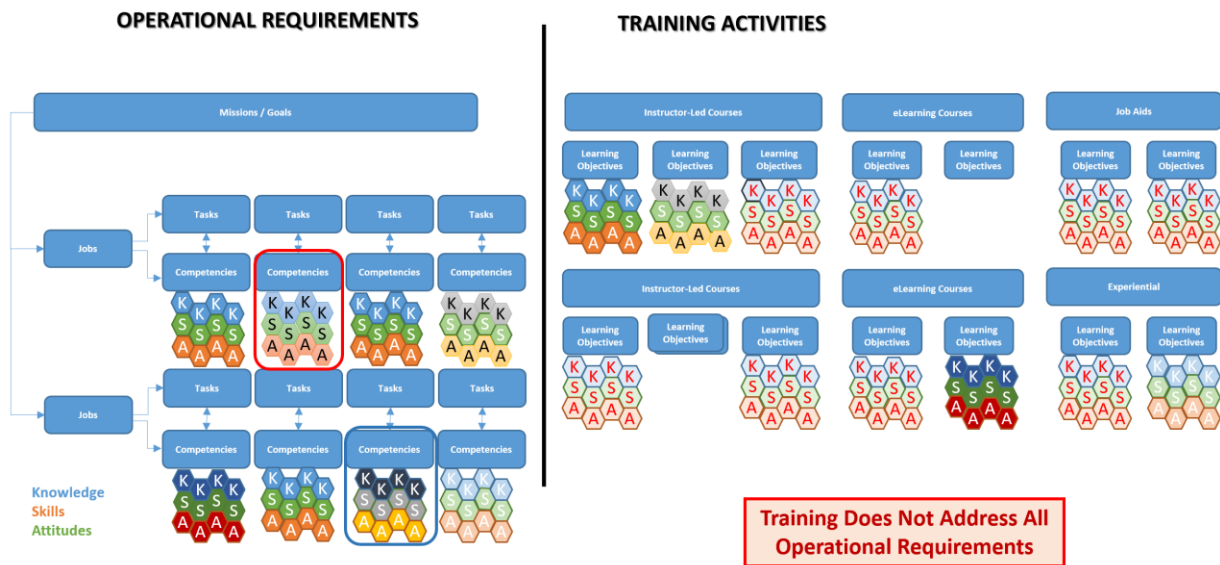


Fig 04. Uncover Training Gaps

By uncovering gaps, training can be updated to improve training effectiveness and minimize costly errors.

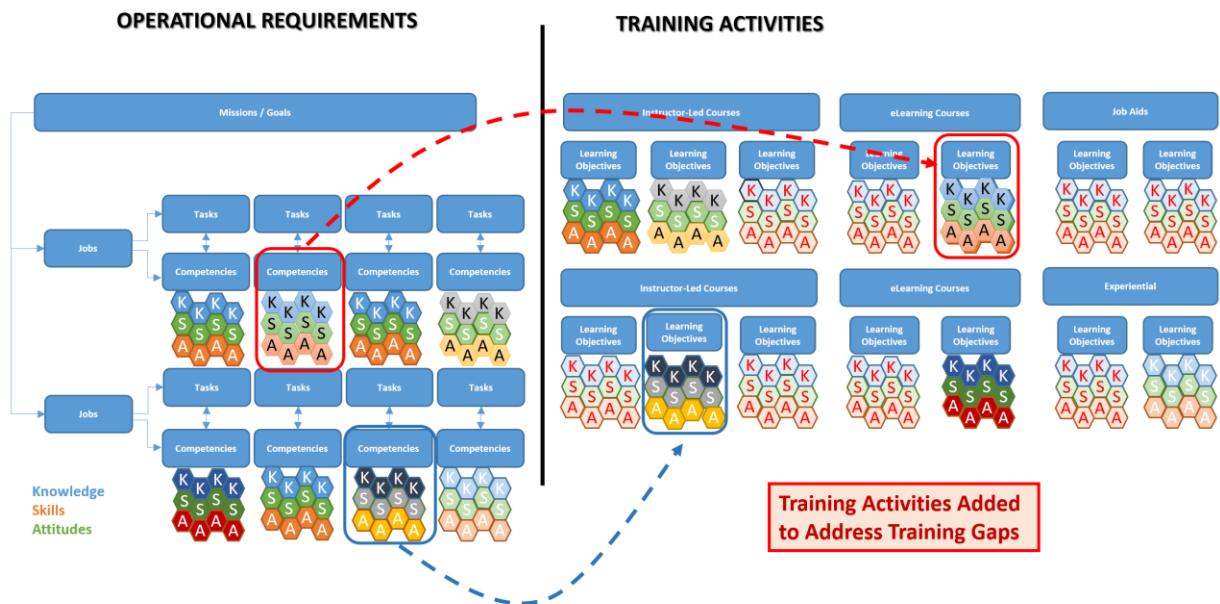


Fig 05. Resolve Training Gaps

Moreover, changes to missions, systems, jobs, policies and/or references may also lead to unnecessary training – i.e., training that is no longer relevant and does not support a specific operational requirement.

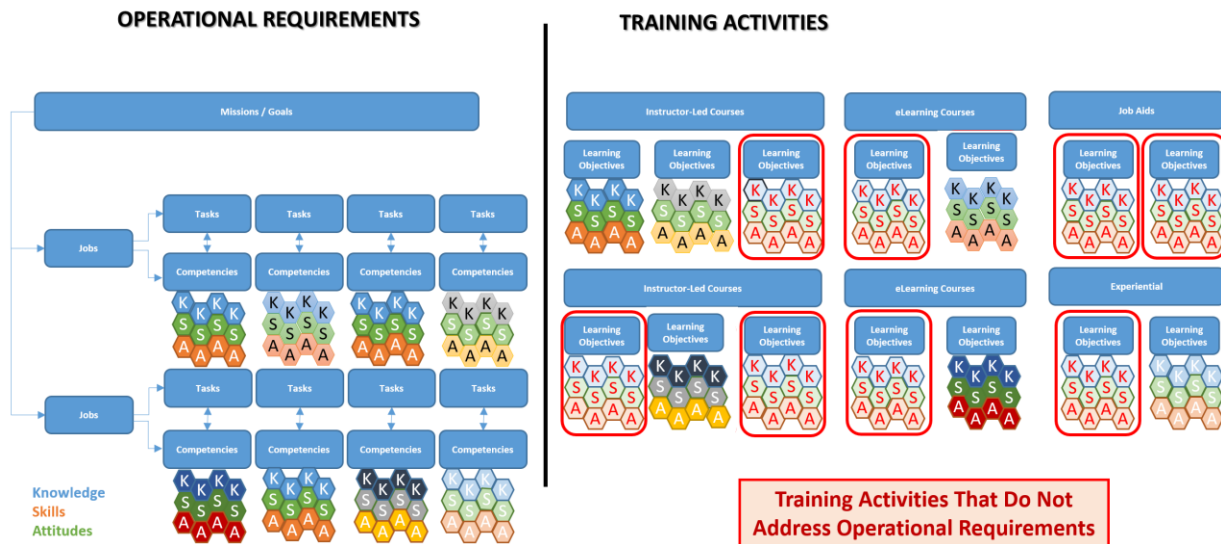


Fig. 06 Uncover Unwarranted Training

By eliminating unwarranted training activities, in addition to minimizing training costs, time to competency is also reduced.

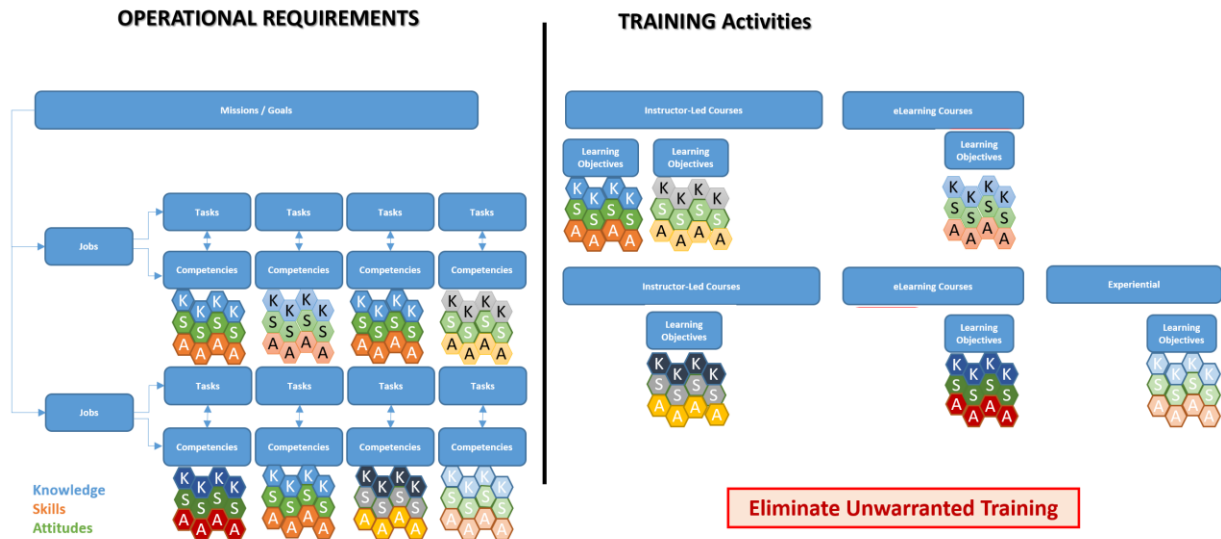


Fig. 07 Remove Training with Minimal Impact

## What Causes Training Inefficiency

Although Training Needs Analysis (TNA) is critical for initial alignment of training activities with operational requirements, changes in missions, systems, jobs, policies, references and so forth, can quickly lead to misalignments and inefficiencies, if organizational structure, policies, procedures and tools cannot keep up with the rapid pace of change. A summary of leading obstacles for maintaining efficiency is presented below:

- ❖ Linear organizational structure. Training analysis, design, development, implementation & evaluation are often performed by different groups/commands, and the data typically cascade from one step to the next. Moreover, feedback processes are highly formalized making it difficult to maintain alignment as issues are uncovered down the stream.

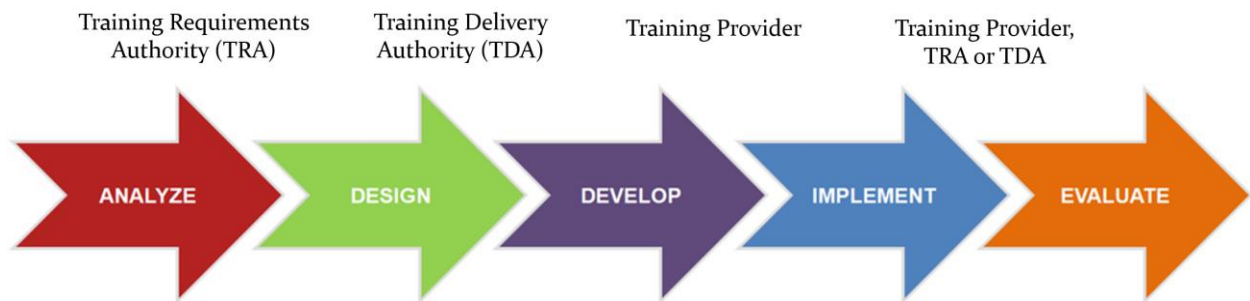


Fig. 08 Linear Organization Structure

- ❖ Occupation/Position/Role Centric Training. Although many training activities are driven by missions and systems, most training requirements are position/job centric. In other words, if multiple jobs are required to operate the same system, the same training requirement will be embedded within all jobs, making it difficult to track and update as the system evolves.
- ❖ Procurement of Training. Training for newly acquired major systems such as aircrafts, ships, armoured vehicles, and so forth, is often delegated to the prime contractor. Although prime contractors are best qualified to determine the knowledge, skills and attitudes needed to operate, maintain and support the equipment, they are not necessarily privy to the levels of competencies of their target audience, nor are they aware of the various training activities that currently exist within their client's organization. As a result, duplicate training activities may be introduced.
- ❖ Inadequate Data Analysis Tools. Most organizations rely on desktop applications such as Word and Excel, or in-house built tools to conduct TNAs and generate training requirements. These tools are, of course, not designed to preserve relationships among various elements such as missions, systems, jobs, tasks, KSAs, training activities, personnel, resources and so forth, making them difficult to update as operational requirements change.
- ❖ Inadequate Data Sharing Tools. Once again, desktop applications are not designed to identify the impact of changes in one document on others. For example, flag relevant learning objectives in all training documents that could be impacted by a change to a system; or identify learning objectives in other documents that can address an upcoming training requirement.

## How to Resolve Training Inefficiency

Producing and maintaining highly efficient training programs within a rapidly changing work environment, is not a onetime event. It requires regular reviews and updates each time a mission, system, job, policy, reference, and so forth, is modified or added. Training Management Systems (TMS) can greatly facilitate the review and update process by quickly assessing the impact of changes on jobs, tasks, KSAs and training; uncovering duplications, gaps, and unwarranted training activities by mapping operational requirements to training activities; as well as facilitating communication among team members.

## What Features Should Training Management Systems (TMS) Have

In general, TMS should have the following key capabilities:

- ❖ Web based. Users including analysts, designers, developers, instructors, evaluators, managers and so forth, should be able to access the data anytime and from anywhere with only a Browser. Access to data can be controlled for each user through privileges.
- ❖ Store all data in centralized relational database. This include missions, systems, jobs, competencies, tasks, knowledge, skills, attitudes, etc. – needed to define the operational requirements; training activities including performance, enabling and learning objectives, target audience, personnel/ resource requirements, etc.; as well as the relationships among them.

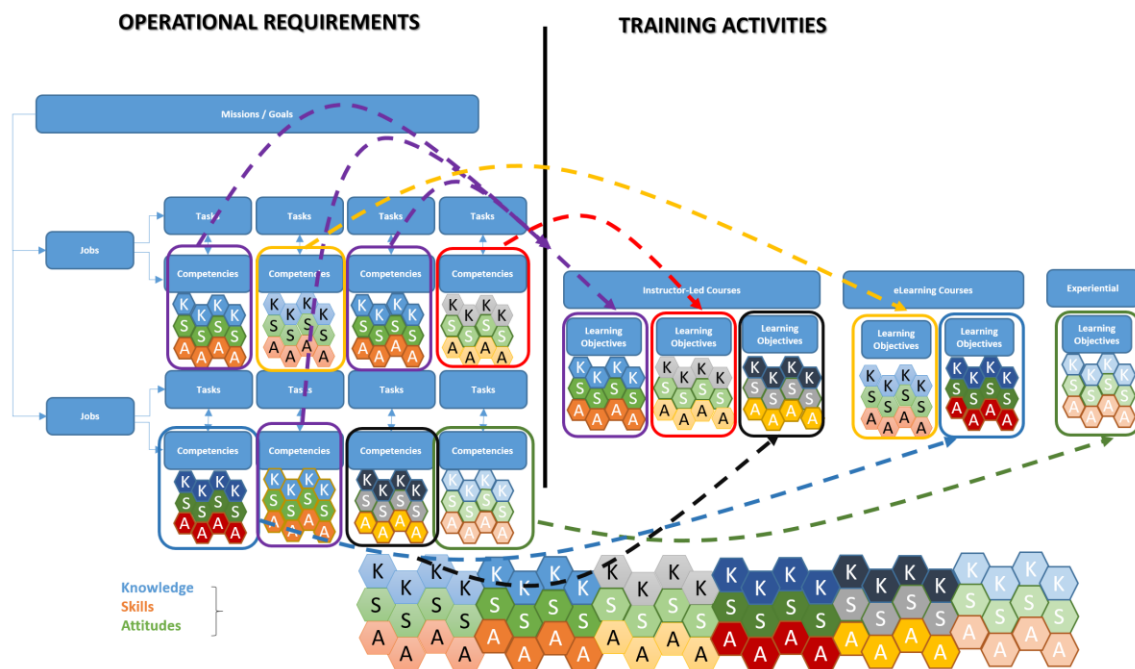
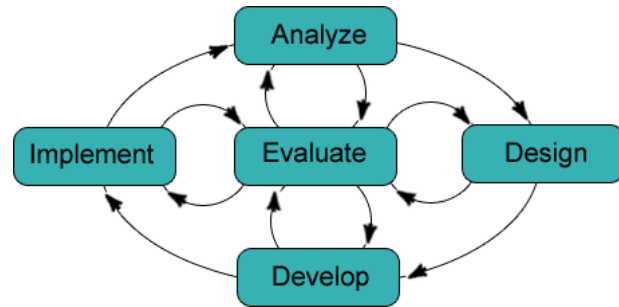


Fig. 09 Maintain Relationships among Variables

- ❖ Facilitate data exchange among various users along various steps; as well as feedback – i.e., alert users of any change up or down stream that can impact them.



- ❖ Simplify and speed Training Needs Analysis. In addition to identifying the training requirements for each job/position, the system should minimize training duplication by identifying current training activities that can meet an upcoming training need.
- ❖ Simplify and speed Training Media/Option Analysis. In addition to considering instructional design requirements to identify viable delivery options, the system should forecast and compare personnel, resources and budget requirements of each option; and identify the most cost effective solution.
- ❖ Continually drive training efficiency by aligning current and future training activities with operational requirements to identify gaps, duplications and training with minimal value; forecasting & comparing the costs of viable delivery options; uncovering cost drivers; improving resource allocation; and so forth.
- ❖ Preserve training integrity, effectiveness, efficiency and relevance by quickly identifying jobs, tasks, training activities, courses, lessons, learning objectives, and so forth that could be impacted by a change to a mission, system, policy or guide.
- ❖ Capable of handling hundreds of thousands of data items including missions, systems, jobs, tasks, KSAs, objectives, training activities, personnel, resources, costs and so forth.
- ❖ Quickly produce reports needed by each team member.

## Measuring What Matters

Although several measures can be generated by Learning Management, Talent Management, Assessment and Readiness Systems including number of trainees, number of graduates, scores, course feedback, readiness and so forth; when it comes to training efficiency the following factors matter the most:

- ❖ **Training Effectiveness.** To measure how well can individuals perform tasks to the desired standards under prescribed conditions. Although many factors can impact trainees’ ability to perform tasks – such as course content, activities, instructors and so forth; from training optimization perspective, the measure should focus on the alignment of training with operational requirements – 0% indicating no alignment and 100% complete alignment.
- ❖ **Costs, Personnel & Resource Requirements.** To measure efficiency – i.e., how much money, personnel and resources are needed for training including the cost per trainee. The costs may of course increase if additional training is needed to close gaps; and decrease by minimizing duplication, eliminating unwarranted training and leveraging technology.



- ❖ **Time to Competency.** To measure the time needed by individuals to attain the desired level of competency. Once again, the time to competency will increase if additional training is needed to close gaps; and decrease by minimizing duplication, eliminating unwarranted training and leveraging technology.

Keep in mind, however, that establishing a baseline – i.e., capturing current level of Training Effectiveness, Training Costs and Time to Competency – is needed to assess whether actions are having a positive or negative impact and why.

## Anticipated Benefits

The following benefits & examples are based on BNH Training Management System ADVISOR Enterprise.

- ❖ **Simplify and Speed Training Needs Analysis (TNA) and Training Media Analysis (TMA);** by:
  - ✓ Simplifying data collection from Subject matter Experts through Excel spreadsheets.
  - ✓ Speeding data analysis using: (a) DIF (Difficulty, Importance and Frequency) model to prioritize training requirements; (b) Media model to identify viable delivery options based on organization, learning and learners needs; (c) Cost model to forecast and compare the costs of viable delivery options; and (d) Performance Analysis model to zero in on the source of a performance deficiency and identify viable solutions.
  - ✓ Speeding report generation. Over 80 types of reports including Master Task List, Master Training Task List, Job Task Analysis, Qualification Standards, Media and Objective Analysis and Training Plan reports can be generated with a single click.

### Case in Point:

- ✓ Jeffrey Hogan, Lead TSRA Analyst with USfalcon noted *“Cuts the time needed to conduct TSRA’s from 18 months to 6 months.”*
- ✓ Jack Wierengo, Database Administrator with Boeing noted *“Changes to Lesson Design Reports (LDR) that could have taken days to complete, can now be generated within 20 minutes”.*
- ✓ Cathi Billings, Instructional System Specialist with Sheppard Air Force Base noted *“I can make changes on the spot and graphs demonstrate right away their impact. That enabled me to cut down my initial analysis from 30 days to one day.”*

- ❖ **Continually Drive Training Efficiency;** by:

- ✓ Aligning current and future training activities with operational requirements to identify gaps, duplications and training with minimal value.

Case in Point: A study for the Department of Treasury revealed significant misalignment between training currently delivered to Examiners in Chief and knowledge/skills required on the job – since new content/activities were being introduced based on a perceived need that is not supported by a specific requirement. In addition to realigning training with goals, credit training was reduced from 15 months to 12 months, while improving performance.

Case in Point: A study for the Air Force revealed approximately 275 hours of common technical training among the following 4 occupations: Aircraft Structures Technicians (ACS), Aviation Systems Technicians (AVN), Avionics Systems Technicians (AVS) and Air Weapons Systems Technicians (AWS) – representing 7% to 36% of course content within each of the 4 streams.

- ✓ Uncovering cost drivers.

Case in Point: A study for the Air Force revealed that the maintenance of infrastructure, roads and grounds, including airfield personnel (i.e., air traffic controllers and airfield firefighters) accounted for 55% of pilots' training budget. The remainder is allocated to aircraft operations (22%), attrition rates, administration/management and instructors. Since infrastructure is the primary cost driver, the Air Force recognized that by reducing the types of aircrafts and/or the number of flights training can be consolidated in fewer locations and lead to significant savings. Moreover, the analysis revealed that the number of flights can be reduced by minimizing attrition rate, speeding candidates screening and leveraging synthetic trainers.

- ✓ Leveraging Training Technology; by forecasting and comparing the costs of viable delivery options.

Case in Point: Hundreds of military, government and corporate organizations realized significant time and cost savings. For example:

- ✓ UK Army uncovered over £140 million pounds in potential saving over a 10 year period in their "Live Fire Review" study.
  - ✓ Study to Canadian Army determined that training technology can reduce budget, personnel and resource requirements in 7 out of 12 courses by 6% to 38% – resulting in a total direct and indirect savings of \$49.3 million over 10 years. However, introducing training technology in the remaining 5 courses would increase costs by 1% to 9% or \$7.3 million over 10 years.
  - ✓ Supported First Data with the successful migration of many instructor-led courses to Web Based Training and Virtual Classroom; as well as reducing training costs and increasing employees' productivity by minimizing travel and time away from the job.
  - ✓ Assisted Lockheed Martin in exceeding client's expectations by: (a) facilitating communication among team members in the US and England; (b) reducing the effort needed to conduct the analysis; (c) isolating and measuring the impact of various factors with ease, and (d) generating a solid business case to support the recommendations.
  - ✓ Enabled the US Courts "to see that with minor adjustments to delivery methods and without sacrificing effectiveness, savings could be realized even in courses with limited shelf-life."
- ❖ **Preserve Training Integrity, Effectiveness, Efficiency and Relevance;** by quickly identifying jobs, tasks, training activities, courses, lessons, learning objectives, and so forth that could be impacted by a change to a mission, system, policy or guide.
  - ❖ **Facilitate Reusability, Collaboration & Configuration Management;** by storing all data in a centralized database that can be accessed anytime and from anywhere by the team with only a browser.

## Final Word

Transforming and optimizing training can only be achieved through a Training Management System (TMS) that provides hard evidence on gaps, duplications and unwarranted training - by mapping current and future training activities to operational requirements; forecasting and comparing the costs of viable delivery options; uncovering cost drivers; improving resource allocation and so forth. Trial and error will not improve training efficiency; knowing what works and what doesn't will!