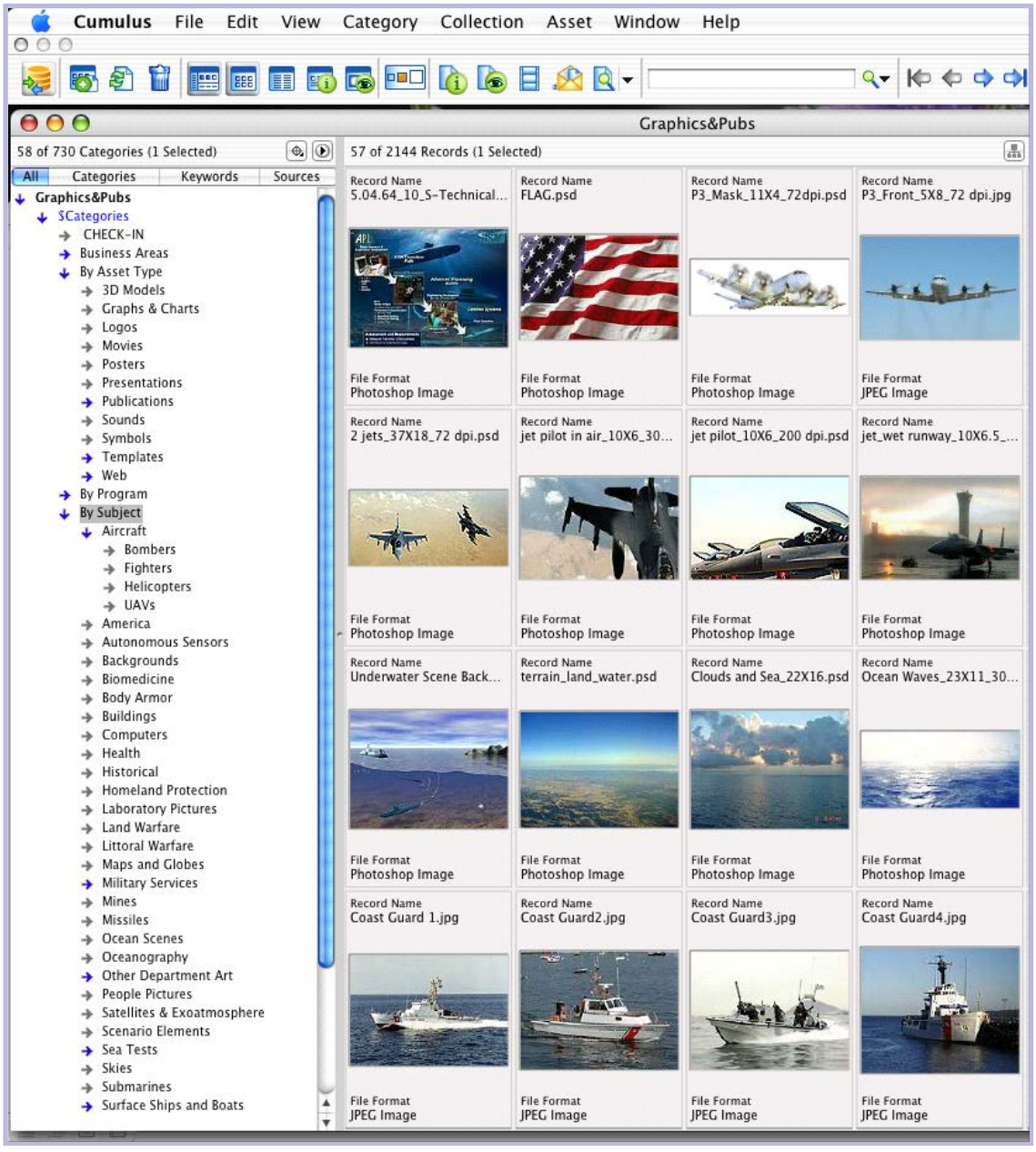
INSTRUCTIONAL DESIGN FOR THE CUMULUS PROJECT

Instructional Performance Objectives, Assessment, Strategy, and Delivery



CHAPTER 3: INSTRUCTIONAL PERFORMANCE OBJECTIVES, ASSESSMENT, STRATEGY, AND DELIVERY

This document describes the performance objectives and assessment instruments, instructional strategy, and delivery methods for Step 2 of the instructional goals for the Cumulus database project. Figure 1 shows the five steps, and Figure 2 shows the subordinate steps and skills for Step 2.

The instructional goals analysis (Chapter 2, Appendix A) formulated the following overall goal of the instruction: The illustrators, desktop publishers, and writers of Visual Information, Editorial, and Web Services (VIEWS) will name and store graphics and publications assets on the VIEWS server consistently, enter assets into Cumulus, and use the features of Cumulus to find assets. The focus of this unit of instruction is on choosing files to be stored in Final and Reusable Components folders on the VIEWS file server.

Using a standard naming convention, consistently organize and archive graphics and publications assets; choose final and component assets for check-in; assign key words to files; check assets into the Cumulus image database; and use Cumulus to conduct searches to retrieve assets.

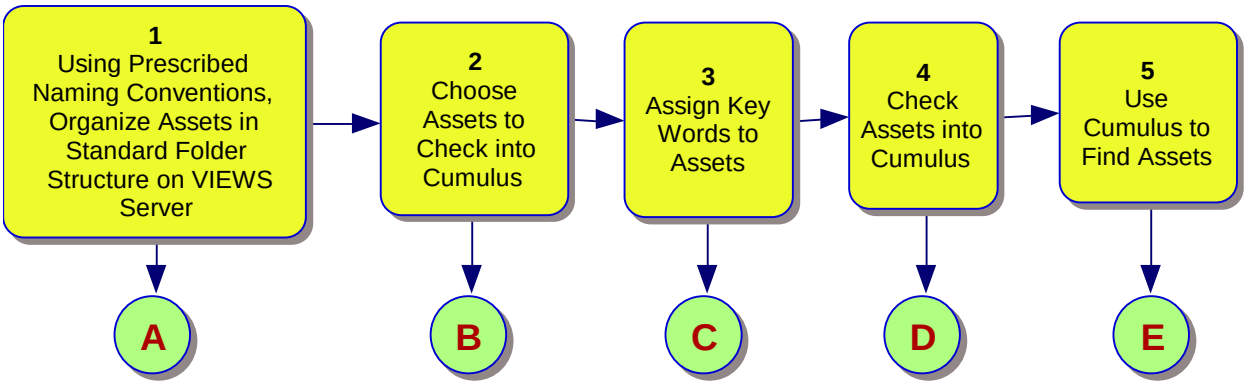


Figure 1: Instructional Goals

Instructional units match the steps defined in the instructional goal analysis; a lesson segment is devoted to each step, and the skills learned in each step become entry behaviors for the next step. Therefore, learners will already be able to name files and folders using the prescribed naming conventions, and will have created the necessary folders during Step 1 to perform the tasks in Step 2.

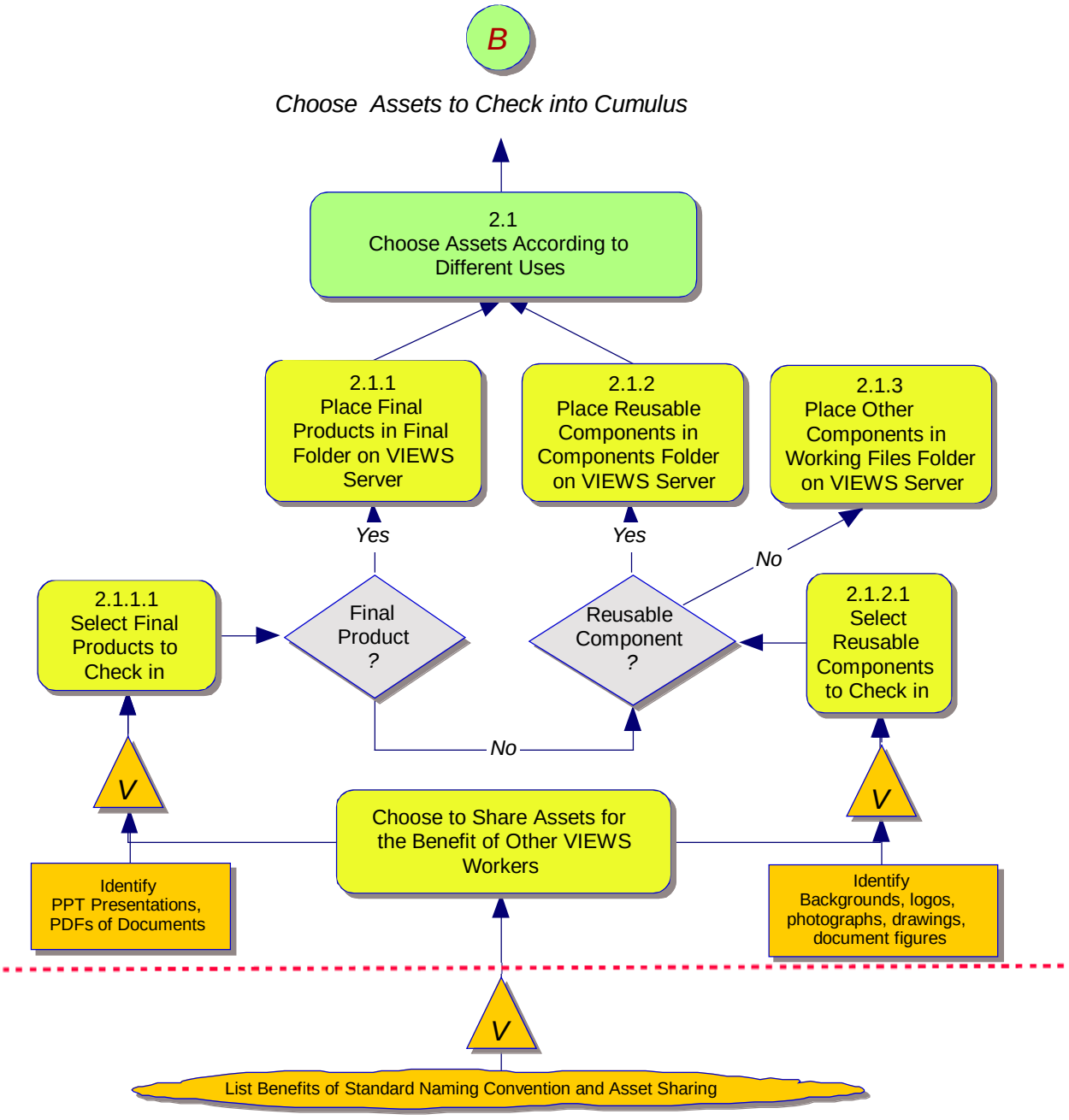


Figure 2: Subtasks and Subordinate Skills for Step 2

3.1 PERFORMANCE OBJECTIVE AND ASSESSMENT INSTRUMENTS

Table 1 summarizes the original instructional goal, terminal performance objectives, and assessment instruments for Step 2 instruction. The table also lists the subordinate steps. Following the table, subsections discuss the conditions, learner behaviors, assessment criteria, and learning context in detail.

Table 1: Instructional Goals, Terminal Objectives, and Learning Context and Assessment Instruments

Instructional Goal	Terminal Objective	Learning Context and Assessment Instruments
Choose assets for checking into Cumulus according to different uses.	Learners will be able to: • Identify and choose final and reusable component files for checking into Cumulus and move them to Final or Reusable Components folders (B). • Decide which assets to choose based on whether the files are complete, final version products (e.g., a PowerPoint presentation or PDF of a publication) or are components that might be reused to produce other products (CR). • Leave all other components in place in their original folders. During the computer classroom exercise, learners will be given three practice sets of files. These files will consist of three completed presentation or publication jobs and will be located in a particular job folder on the VIEWS server (CN).	Pairs of learners will examine each other's Final and Components folders using a checklist of criteria to determine if Final files selected are the latest version of the completed products and component files are suitable for reuse. Learners will choose components for the Reusable Components folder that fit the criteria for reusability, so that the files are: • Native application files (e.g., Photoshop, Illustrator) that can be changed (e.g., rather than flattened jpegs or pngs) • Generic in nature (e.g., backgrounds such as landscapes; graphical objects such as line drawings of ships, human figures, or logos; and photographs) rather than items specific to a single project (e.g., a schematic of a circuit or communications system) Learners should take less than 10 min to choose files for each job.

Instructional Goal	Terminal Objective	Learning Context and Assessment Instruments
2.1.1 Place final products in final folder on VIEWS server	Given a job folder containing all components of a completed publication or presentation job (CN) learners will be able to: • Choose the file that constitutes the final, deliverable product and place it in the folder entitled “Final” (B). • Identify all files associated with the final product needed to publish or present the product, including multimedia files and subsidiary files that may be needed to supplement the main file (e.g., a movie that runs within a PowerPoint presentation) (B). Learners should be able to perform these tasks accurately in less than 10 min.	In an online exercise in the computer training facility, learners will: • Choose the final file or files from a sample folder on the VIEWS server containing all the files created and used in producing a final product. • Identify which files constitute the final product and move them into the folder named Final. Learner pairs will examine each other’s job folders to determine if they placed needed files correctly in the Final folder. In addition, the instructor will compare learners’ folders with a checklist of predetermined files that learners should place in the Final folder. Learners should choose 100% of final files and 80% of reusable files correctly within a 10-minute time limit. The instructor will ask learners to indicate when they have completed the input and again when they have completed the partner review so the instructor can rank their proficiency based on completion time.
2.1.1.1 Select final products to check in	Learners will be provided with a folder containing all the files that constitute a completed publication or presentation product (CN). From this folder, learners will be able to identify PowerPoint presentations and PDFs of documents as the final product (B) by: • Examining the date and time the file was last modified, • Comparing it with other files in the job folder • Using other resources such as the VIEWS tracking database and contacting originators (authors or editors who receive the final product) Partners will verify if selections constitute the final file set (CR).	The instructor will designate final files in advance. Learners should be able to identify the final product by observing the date the file was last modified, type of file (e.g., PowerPoint for presentations and PDF for publications), and examining content of the file. Learner pairs will assess the appropriateness of their partner’s selections and provide feedback to one another.

Instructional Goal	Terminal Objective	Learning Context and Assessment Instruments
2.1.2 Place reusable components in folder named Reusable Components on the VIEWS server	From the same unorganized folder containing all of the files that constitute a completed product (CN), learners will demonstrate ability to locate and place reusable components in the proper folder (B). Learners will refer to a list of characteristics of reusability to judge whether they should place a particular kind of file in the Reusable folder (CR).	The instructor will also predesignate component files. Learners should be able to identify the components best suited for reusability by examining the files to see if they contain information that is only suited to the current product or contain elements that can be applied to other, similar products. Learner pairs will assess appropriateness of selections and provide feedback to one another.
2.1.2.1 Select reusable components to check in	Learners should be able to identify backgrounds, logos, drawings, and document figures that may be useful in creating new products.	After selecting files, learner pairs will compare results against a table of suggested characteristics of reusability and discuss reasons for choosing particular files.

3.1.1 LEARNING CONTEXT

The learning domain for this instruction is Intellectual Skills. Learners must be able to apply rules learned in Step 1 and subordinate skills of Step 2 to decide which files to choose.

The learning context is primarily a classroom training session, supplemented with individual self-training using instructional materials at individual workstations. Classroom instruction will take place in a computer training facility in which each learner will have his or her own workstation including complete access to the VIEWS server. Instructions for each step will include a presentation followed by exercises in which learners perform the required tasks.

During the training session for Step 2 in the computer training facility, the instructor will place three job folders in each learner's personal folder on the server, which learners can copy to their desktop for the exercise. The folders will contain equivalent numbers of component and final files. For each job, the instructor will pre-identify one final and five reusable files based on the criteria for final and reusable. Learners must identify 100% of final files and 80% of reusable files correctly within 10 min for each job.

Learners will work in pairs on identical sets of three jobs. Each learner will work independently at his or her computer terminal to choose files and place them in appropriate folders on their computer desktop. As part of the assessment process, learners will then exchange folders with their partner and examine each other's selections. They will also submit their selections to the instructor for review.

3.1.2 ASSESSMENT INSTRUMENTS

This objective involves completing a task online (moving files to designated folders). The primary method of testing will rely on pairs of learners who will verify that learners choose appropriate files for each category. In the three sets of files provided to learners, the instructor will pre-identify final and component files and compare them with the learners' choices. Successful completion requires 100% of final files chosen correctly and 80% of component files. The criterion for reusability is lower because identifying reusable files relies on somewhat subjective judgments.

Teammates will use a checklist of criteria for reusability to justify their own selections and verify their teammate's selections. Because reusability can be a qualitative judgment, learners should be able to explain why they think an item is reusable.

Because it may require opening numerous files to determine reusability or finality, exact timing cannot be a definitive measure of proficiency in choosing items. However, the instructor will tell learners that it should take no more than 5 to 7 min to select files for each job, and another 5 or 6 min to check each other's selections. The instructor will give the class a maximum of 30 min to complete the exercise and encourage learners to complete them quickly so the class can progress to the next lesson.

Learners will score each other's selections on a handout rubric table, which they will submit to the instructor at the end of the lesson. The instructor will review the handouts to determine if partners accurately judged one another's work. In the ensuing 2-week trial period, the instructor will provide extra feedback to learners who did not identify files accurately.

Learners should also verify that the folder structure complies with the guidelines learned in Step 1 and correct the naming and structure if needed. When the exercise is complete, there should be Final, Reusable Components, Working Files, and Originals folders. A Final folder should contain only the complete product. The Final folder might contain numerous linked files (e.g., movies or sound files that run within the main PowerPoint file or a PDF file to which the main PDF document might link). These associated files need to be contained in the same folder for the linking path to work.

From each job folder, learners should be able to identify the final product by looking at the date the file was last modified, seeking the largest PowerPoint or PDF file, opening the file if necessary to check the title page, and leafing through the document or presentation. Learners can gather other clues by searching the VIEWS tracking database for information on delivery dates, posted comments on production, etc. Each job should have a corresponding physical folder in the VIEWS archive or a record in the database about when and to whom the final product was delivered.

In the classroom, learners will have complete online access to the VIEWS server, tracking database, and e-mail. Learners will be encouraged to use all resources available to them to identify the final product (including contacting customers by e-mail or VIEWS archives to verify, if needed). Because of the classroom environment, most learners will need to rely on the instructional materials or questions to the instructor. They will be more likely to use other sources such as contacting the archives or customers during the 2-week trial use period before the follow-up classroom training session.

3.2 INSTRUCTIONAL STRATEGIES

3.2.1 CONTENT SEQUENCING

This lesson is sequenced in the order of objective steps (Figure 2); i.e., learners will identify and place final files first and identify and place reusable files second. Learner pairs will compare their partners' results after they have selected and placed both final and reusable files in their respective folders.

Table 2 shows the sequencing and clusters for Steps 1 and 2. Step 1 is included for context because it contains the setup of the folder structure used in Step 2. The instructional sequence consists of two portions: an instructional presentation by the instructor and practice sessions by the learners.

Table 2: Clustering and Sequencing of Performance Objectives

Cluster	Instructional Goal Step	Instructional Sequence
1	Main Step 1: Using prescribed naming conventions, organize assets in standard folder structure on the VIEWS server	1.1 Name job components using consistent naming conventions ("cheat sheet" rubric table provided): • 1.1.1 Discussion of benefits of using a standard naming convention when sharing assets • 1.1.2 Demonstration of folder naming • 1.1.3 Demonstration of file naming 1.2 Store assets using graphics folder structure; instructor provides demonstration of how to create: • 1.2.1 Final folder • 1.2.2 Reusable folder • 1.2.3 Working Files folder • 1.2.4 Originals folder

Cluster	Instructional Goal Step	Instructional Sequence
2	Main Step 2: Choose assets to check into Cumulus	2.1 Instructional presentation on how to choose assets according to different uses: • 2.1.1 Facilitate discussion of definition of final files for various types of products ("cheat sheet" rubric table provided) • 2.1.2 Define reusability • 2.1.3 Define working files 2.1.4 Define original files
2	Main Step 2: Choose assets to check into Cumulus	2.2 Practice session directions: Choose a partner to work with during this phase of the instruction. Each of you will do the following: • Decide which file or files constitute the final product and place them in the Final folder. Be prepared to explain to your partner why you chose the particular files. • Do the same for component files that might be reusable. Note that the decision about which files are reusable involves a value judgment, so you must be able to explain why you chose each file. • After you have placed final and reusable files in their appropriate folders, create a new folder titled "Exercise_lastname" and place it in your shared folder on the server so your partner can copy it to his or her desktop to review, and so the instructor can check your selections. • Partners will then examine the folders and, using the rubric table to check the files, determine if files were chosen appropriately. Note files you believe were inappropriately placed or were left out and list them in preparation for a consultation with your partner. • Review your checklist with your partner and compare and discuss your results. We will review this exercise in class, so be prepared to report your results, including discussing any particular files you may have chosen that your partner did not, and be able to explain why you believe a file may or may not be final or reusable.

3.2.2 PRE-INSTRUCTIONAL ACTIVITIES

This lesson follows Step 1, in which each learner has created a folder structure on his or her computer desktop containing folders for Final, Reusable, Working, and Original files. Therefore, one aspect of the pre-instructional activity is determining that each learner has created the structure properly. Learner's will select a partner, and each pair will check each other's folder structure and make adjustments as needed (part of the Step 1 instructional session). The instructor will also circulate in the computer classroom to check the folder structure on each learner's desktop.

The instructor will prepare the files for this exercise, so it is not necessary to include pre-instructional testing of learners' ability to name files properly. Step 1 contains a test in which learners are given sample files and are required to identify if they are named properly according to the naming convention, and to correct them if needed. The focus of Step 2 is on deciding which files belong in Final and Reusable folders. Table 3 summarizes the pre-instructional activities.

Table 3: Pre-instructional, Assessment, and Follow-through Activities

Category	Description
Motivation	The instructor will explain that the training session will provide learners with tools to make their jobs easier. Discussion will center on the need for structuring the way content is organized on the server. Instructor will explain how the server structure meshes with using the Cumulus database as a tool for finding components that might be useful in creating new products. The instructor will reiterate the benefits of sharing assets that were discussed in the preceding lesson for Step 1. The presentation will illustrate how consistent folder structures make it easier for others to identify and locate different types of assets. The instructor will emphasize the benefits in productivity that everyone will enjoy.
Objectives	Learners will be able to decide which files qualify as reusable components and which files define final products.
Entry Behaviors	Because this segment immediately follows Step 1, in which learners named files and set up the folder structure, entry skills do not need to be reviewed. For this objective, no pre-instructional testing will be needed for entry behaviors.
Student Groupings	Partners were selected during Step 1, and learners will keep the same partners for this and all subsequent lessons. Partners will sit at adjacent workstations in the computer classroom.

Category	Description
Media Selections	The instructor will present the procedure document and “cheat sheets” to guide learners in using the procedures on their own. Instructional documents will be PDFs that can be viewed online and printed out. For the lessons presented in the computer classroom, the instructor will first demonstrate the procedure on the projected computer screen, after which the learners will conduct the exercises on their individual workstations.
Practice and Assessment	In-class practice will be on preselected materials so feedback can be consistent. During the 2-week introductory use period, learners will begin using the procedures on actual assignments. Learners will have the opportunity during that time to get immediate feedback from the instructor. Learners will also get feedback from partners during the second training session, in which learners will discuss their experiences using the procedures. Partners will assess each other’s work, and the instructor will provide feedback to the entire class based on individual assessments.
Follow-through and Transfer	After the second training session, in which all procedures will be reviewed and learners’ experiences shared, learners will receive feedback on new jobs when they are completed (i.e., the instructor will periodically check their selections and provide feedback if needed). The instructor can determine the level of transfer by examining the scoring sheets learners used in rating their partner’s selections. In addition, by examining actual assignment folders, the instructor can identify learners who my need reinforcement.

3.3 DELIVERY SYSTEM, MEDIA SELECTIONS, AND LEARNING ENVIRONMENT

3.3.1 DELIVERY SYSTEM

Instruction will consist of computer classroom demonstration and practice reinforced with sets of written instructions illustrating each step. After the instructor demonstrates each step on a projected computer screen, learners will perform the step on their classroom workstation and compare results with their partner before the instructor demonstrates the next step.

Instructional documents will be distributed to aid learners in reviewing all of the steps at their individual workstations when they begin using the procedure on their next job assignment. Because learners are graphic illustrators, instructional materials will consist of mostly visual aids (e.g., screen captures for each step), including illustrations of how each lesson and step fits into the entire workflow involved in using the Cumulus database as a job aid.

Classroom presentation will begin with a brief PowerPoint presentation (three to four slides) to convey the benefits of having a standard file structure and asset-sharing tools and techniques. The instructor will conduct a follow-up training session 2 weeks after the first in which learners can ask questions about the procedures and discuss problems they may have encountered with the instructional materials and in carrying out the procedures.

3.3.2 STUDENT GROUPINGS AND ENVIRONMENT

Learners are grouped in pairs to facilitate feedback and “testing” (checking appropriateness of file selection and placement). Pairs will be able to compare their results and give each other feedback on their choices. The instructor will also provide feedback to each pair.

During the instructional exercises in the computer training facility, learner pairs will sit at adjacent workstations to facilitate discussion. Because the instruction takes place in an online environment, learners can continue the feedback session after the instructional session if needed.

The follow-up session will occur after learners have gained 2 weeks of experience using the system. This will provide an effective method of transferring classroom learning into the work environment.

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Appendix A: Instructional Goal Analysis

CHAPTER 1: INTRODUCTION: INSTRUCTIONAL GOAL ANALYSIS FOR THE CUMULUS PROJECT

Illustrators and desktop publishers in Visual Information, Editorial, and Web Services (VIEWS), a graphics and publications shop in the National Security Technology Department (NSTD) at the Applied Physics Laboratory (APL), create a variety of publishing products using applications such as Adobe Photoshop, Illustrator, InDesign, and FrameMaker as well as Microsoft applications such as PowerPoint. The files they create in these applications are stored on a central VIEWS server accessible by a closed local area network (LAN).

Currently, staff members do not consistently archive material on the VIEWS server, making it difficult to retrieve digital assets[1] for reuse. The current archiving system on the VIEWS server is simply a collection of folders listed by job number and customer name containing assets used in a particular project. Different staff members organize the assets within those folders in different ways, making it difficult for others to identify final products and reusable components.

The VIEWS Knowledge Management (KM) team is developing a visual database tool to help users locate assets stored on the VIEWS server. The Cumulus database (Figure 1) will contain links to final and reusable assets categorized by job number, subject (e.g., biomedicine), asset type (e.g., photo, drawing, viewgraph presentation, report), and administrative information (e.g., business area, budget, author, project name). Illustrators, desktop publishers, editors, and authors will be able to find assets stored on the VIEWS server by looking at thumbnails grouped by content categories and by performing key-word searches.

Users (starting with VIEWS staff) need instructions and training on how Cumulus works, how to enter assets into its database, and how to use its search features to retrieve assets from the VIEWS archive. In preparation for that training, the illustrators and desktop publishers who create content need instruction in using consistent file-naming and archiving procedures when they store assets on the VIEWS server; background instruction to help them understand concepts of relational databases, metadata, categories, and key words; and procedural instruction on how to use the Cumulus interface.

This document details the need and rationale for instruction, specifies the performance goals, presents an analysis of what VIEWS staff need to know to use the Cumulus tool effectively, and describes the target learners and the context in which they will be receiving instruction and using Cumulus.

[1] Cumulus terminology defines assets as the digital files such as photo originals in the form of Photoshop (.psd) or Joint Picture Experts Group (.jpeg) files, PowerPoint (.ppt) files, logos, etc.

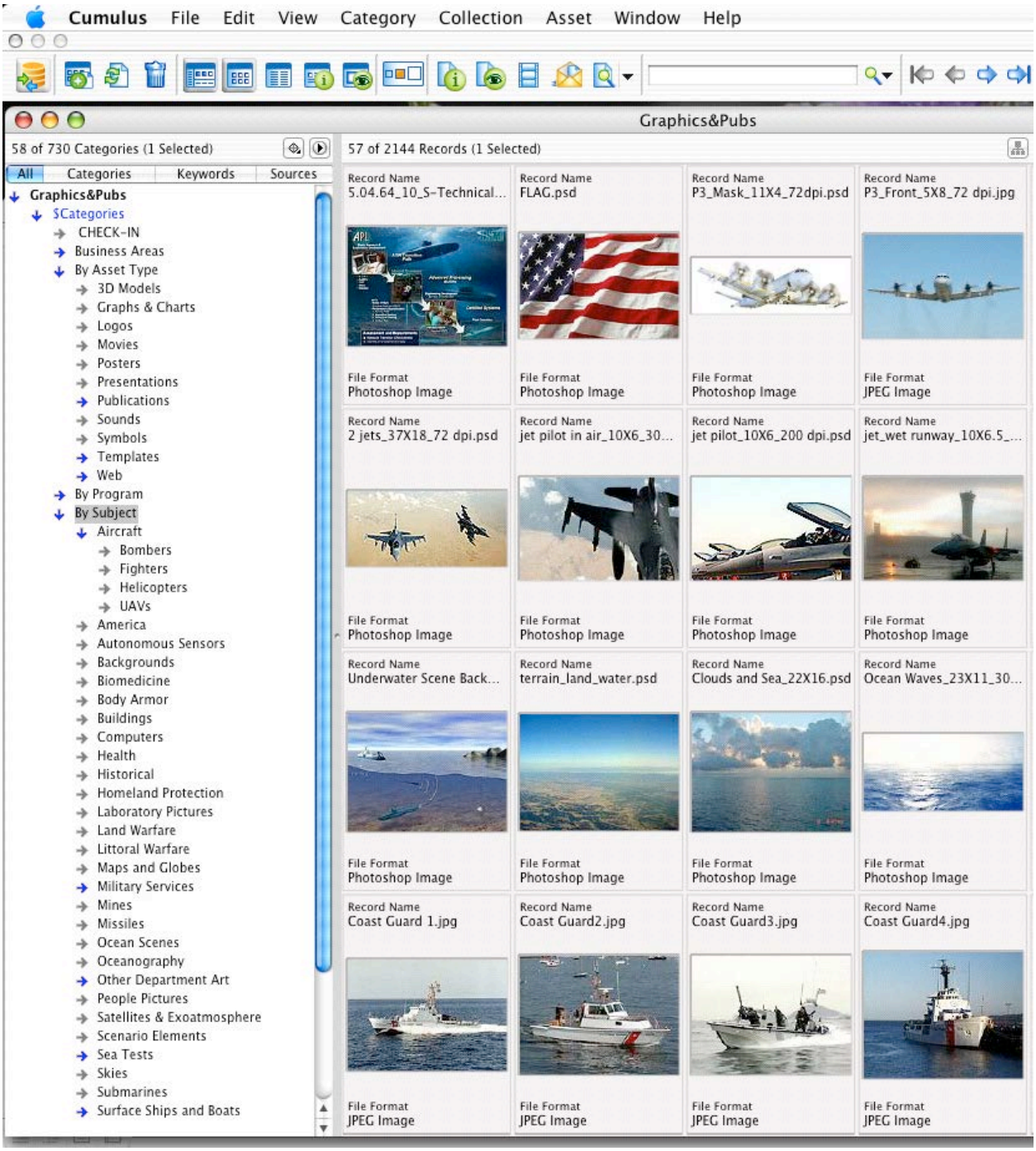

Figure 1: Cumulus Interface

CHAPTER 2: INSTRUCTIONAL GOAL ANALYSIS

2.1 Need and Goal Statement

2.1.1 THE PROBLEM AND INSTRUCTIONAL NEED

By examining the VIEWS server archives, the KM team determined that the performance problem is that VIEWS staff inconsistently archive electronic files ("assets") and consequently have difficulty retrieving files that need changes or that might be useful in creating new products. A prior performance analysis determined that digital assets such as PowerPoint presentation files and photographs are hard to find once they are completed, resulting in production efforts being duplicated and time wasted recreating unfindable work.

For example, illustrators often create text for a PowerPoint slide in Photoshop or Illustrator, save the file as a jpeg file, and insert it into the PowerPoint slide. Later, when other staff members need to modify the text, they must retype the text because they cannot find the original Photoshop or Illustrator file. The artist may not have saved the jpeg when he or she created it or saved it in an obscure location on the VIEWS server. Text saved as an image is not searchable using the search engines within the operating system (e.g., the Search feature in the Finder of Macintosh OS 10.4 can locate words within a text file but not within an image). Changes in work processes can solve part of this problem (e.g., by requiring text to be created in PowerPoint or in separate Word files that are archived along with the images). However, this solution may result in limiting creative uses of PhotoShop and Illustrator (e.g., using text as a graphical element in an icon or logo and using Photoshop to reduce the image size). These changes in work processes will require minimal instruction and will help increase findability, but they do not completely solve the problem of finding assets quickly, which is essential in a deadline-driven production shop.

Different illustrators have different ways of organizing the various components of the products they create. Consequently, when others need to make changes to a product, they may not be able to identify which are the final components or latest versions. Establishing standard archiving procedures is also a partial solution to this problem, also requiring minimal instruction. However, the ability to view images of assets is limited. Macintosh OS 10.4 Search creates low-resolution thumbnails of some applications (e.g., later versions of Photoshop and jpegs that include thumbnail formatting); however, in many cases, a user needs to open the application to get a detailed view of the image – which can become a time-consuming task when searching multiple candidate images.

The VIEWS KM team conducted a return on investment (ROI) analysis that indicated that investing in a visual, category-indexed database linked to the archiving server

would pay for itself by saving time now spent searching for assets, recreating lost assets, and parallel duplicate efforts to produce similar elements (e.g., backgrounds). The ROI study found that inefficient content management currently adds an estimated 15% to the cost of each task. This estimate was calculated by averaging the costs of all jobs with the known occasions when work was duplicated, files were lost and had to be recreated, or searching for assets in the present archives took extra time.

A graphics production shop in another department at APL was using a system called Cumulus and recommended it because it allows users to search for graphics visually, by simply looking at collections of thumbnails of images, or by category or key-word searches. Cumulus is a database system for viewing and organizing assets stored on a separate server. The interface includes simple drag-and-drop functions to allow users to categorize and display different types of files such as photographs. The ROI study concluded that an instructional program to train 13 VIEWS staff members in how to use Cumulus would provide a comprehensive solution to the extra expense of searching for lost assets and result in lower cost for all products.

The KM team established an archiving folder structure for files stored on the VIEWS server, introduced a file-naming convention based on a job-numbering system, established a database to track metadata for each job (author, budget, project and program names, etc.), and created an information design for Cumulus including a taxonomy of content categories.

In a pilot study, the KM team installed Cumulus and entered a selected amount of material into the database to test its functionality. The KM team presented to Business Area Executives (BAEs) a pilot collection of the BAEs' PowerPoint presentations and asked them to assess the value of continued development of greater search capability. The BAEs enthusiastically reviewed the pilot collection and approved further development by creating a dedicated budget for the project.

Management has tasked the KM team with training VIEWS staff in how to use the system. To further develop and test the procedures for using Cumulus, the team must first design an instructional plan for conducting training sessions and creating instructional materials to aid staff in learning how to use Cumulus. The first step in this process is defining instructional goals.

2.1.2 OVERALL PERFORMANCE GOAL

The overall performance goal is for illustrators and desktop publishers to name, archive, and enter graphics and publications assets into the Cumulus system, assign appropriate descriptors to those assets to make them more findable, and integrate the use of Cumulus into their workflow (e.g., use it to find assets they might need in creating new visual information or publication products). The KM team must design instruction to provide guidance (rules) for accomplishing these goals. Users need to know how the Cumulus interface works, understand how it is organized, and adjust their work practices as needed to accommodate entering their work into the system. If the

instruction is effective, learners will be able to name and store assets consistently on the VIEWS server, choose assets to enter into Cumulus, attach key word and category descriptors to assets, use Cumulus to view assets that have been indexed, identify what they need visually, and retrieve assets by tracking them back to where they reside on the VIEWS server.

Although entering assets into Cumulus is a simple drag-and-drop process that a series of procedural steps can describe, making the assets searchable and findable will require VIEWS staff to tag content with applicable categories and key words (i.e., choose content descriptors specific to the products they create). To do this effectively, they must first demonstrate knowledge and understanding of the definitions of and distinctions between categories, key words, and other types of metadata. (See Subordinate Skills Analysis in Section 3.2.) Although the Cumulus user manual defines terminology and has basic tutorials on how to use the interface, and VIEWS staff may be able to use the manual to learn the basics on their own, all VIEWS staff members need to be able to use Cumulus at a defined level within a short time. Therefore, a structured training program is an effective way to ensure rapid, consistent, and comprehensive mastery of needed skills. A well-designed instructional program can also provide a way to measure how well VIEWS staff members are able to perform the procedures.

The VIEWS tracking database can furnish some search information (metadata) for a particular job before the illustrator or desktop publisher begins work on the job. For example, authors will provide subject area key words when they submit a job to VIEWS that will be entered into a tracking database along with administrative information from a form-based interface); this information will always be associated with the job number, and it can be ported into Cumulus from the tracking database (future project). Staff can easily assign some categories (e.g., asset type is defined by the file extension – jpg, ppt, doc, etc.). In addition, illustrators and desktop publishers will have to choose general, predefined category descriptors (e.g., aircraft, biomedicine), and create unique, specific descriptors and enter them in a key-word field, either in Cumulus or in the native application.

2.1.3 INSTRUCTIONAL GOALS

Achieving the institutional goals of preventing duplication of efforts or having to recreate unfindable assets and fostering sharing of assets and standardization of production methods depends on VIEWS graphics and desktop publishing staff mastering the following skills and practices:

- Use the new folder structure and file-naming convention when saving assets to the VIEWS server so that everyone in VIEWS organizes assets in a similar manner.
- Select assets from completed jobs for checking into the Cumulus visual database.

- Add key words to the metadata of assets, preferably in the native application (or in Cumulus).
- Contribute assets to Cumulus using a standard procedure.
- Select and assign content categories for each asset checked into Cumulus.
- Demonstrate ability to search for assets once they are checked into Cumulus.
- Find and retrieve existing assets for use in new work.

2.2 Instructional Analysis

2.2.1 Goal Analysis (Procedural Steps)

Figure 2 is a flow chart showing the top-level goals of the instruction. The overall performance goal is for VIEWS illustrators, desktop publishers, and writers to name and store assets on the VIEWS server consistently, enter assets into Cumulus, and use the features of Cumulus to find assets. Using a standard naming convention, learners (13 VIEWS staff members) must consistently organize, store, and archive graphics assets; choose appropriate final and component files for check-in; assign key words to each file; check assets into the Cumulus image database; and use Cumulus to conduct searches to retrieve graphics assets.

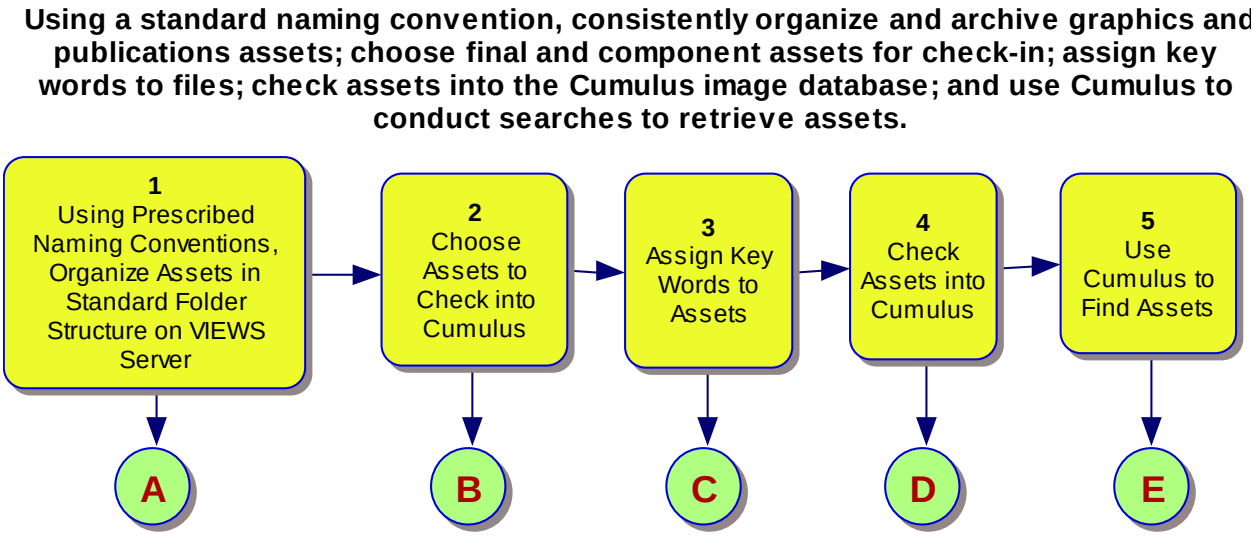

Figure 2: Instructional Goals

VIEWS staff will use the naming, archiving, and Cumulus cataloging procedures integrally with every job assignment using the latest version of Cumulus installed on their PC or Macintosh workstation. When they have completed an assignment, they will check the final product and reusable components into the Cumulus database following the prescribed procedures.

Figures 3 through 7 provide further details of each step in Figure 2 (letters A through E, respectively), including the subordinate skills, knowledge, and procedures needed to perform each step. When relevant, the figures show (below a dotted line) the baseline (or entry-level) skills needed before the subordinate skills can be mastered (Sections 3.3 and 4.1.1). Illustrators and desktop publishers in VIEWS need to perform the following procedural steps for entering assets into Cumulus:

1. Name all components in a job using a prescribed naming convention and organize assets in a standard folder structure on the VIEWS server (Figure 3). To do this properly, learners must perform the following subtasks and demonstrate the following subordinate skills:

   Name folders using NSTD job number and author name following printed guidelines (“cheat sheet”).

   Make sure all files include the NSTD job number and other elements of the file-naming convention.

   Place final products in Final folder.

   Place component files in Components folders.

   Place original files (e.g., author drafts, images from external sources) in the zOriginals folder.

Note that in Figure 3, subordinate skills for Step 1.3 are similar to those for 1.2 and are omitted for economy.

2. Choose assets to be checked into Cumulus (Figure 4):

   Select files based on their uses (final products to be published or presented and components for reuse).

   Select appropriate files for Cumulus Final product file (e.g., PowerPoint).

   Decide what is reusable and what is unique to a job; make distinctions between final products and subcomponents that can be shared.

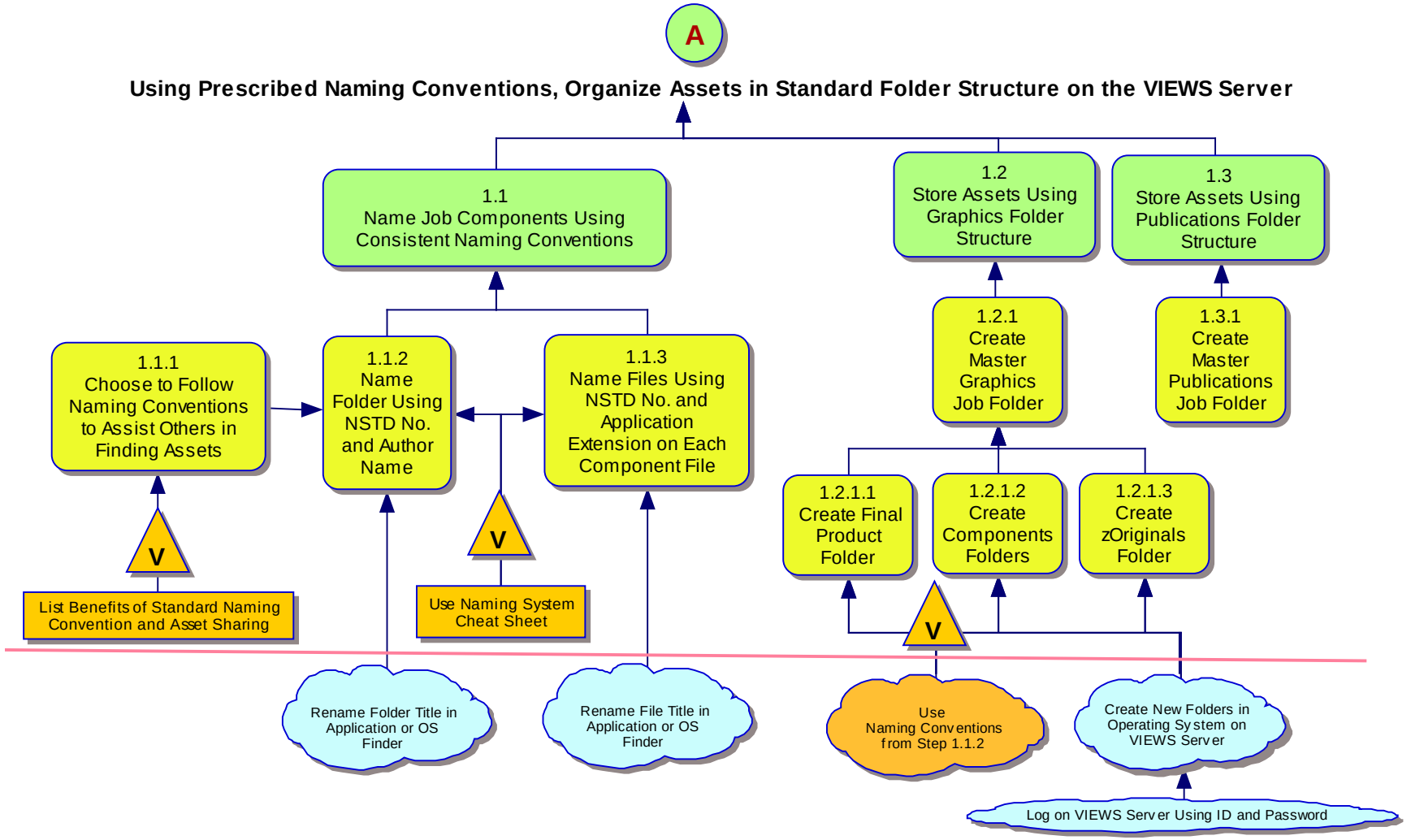

Figure 3: Subtasks and Subordinate Skills for Step 1

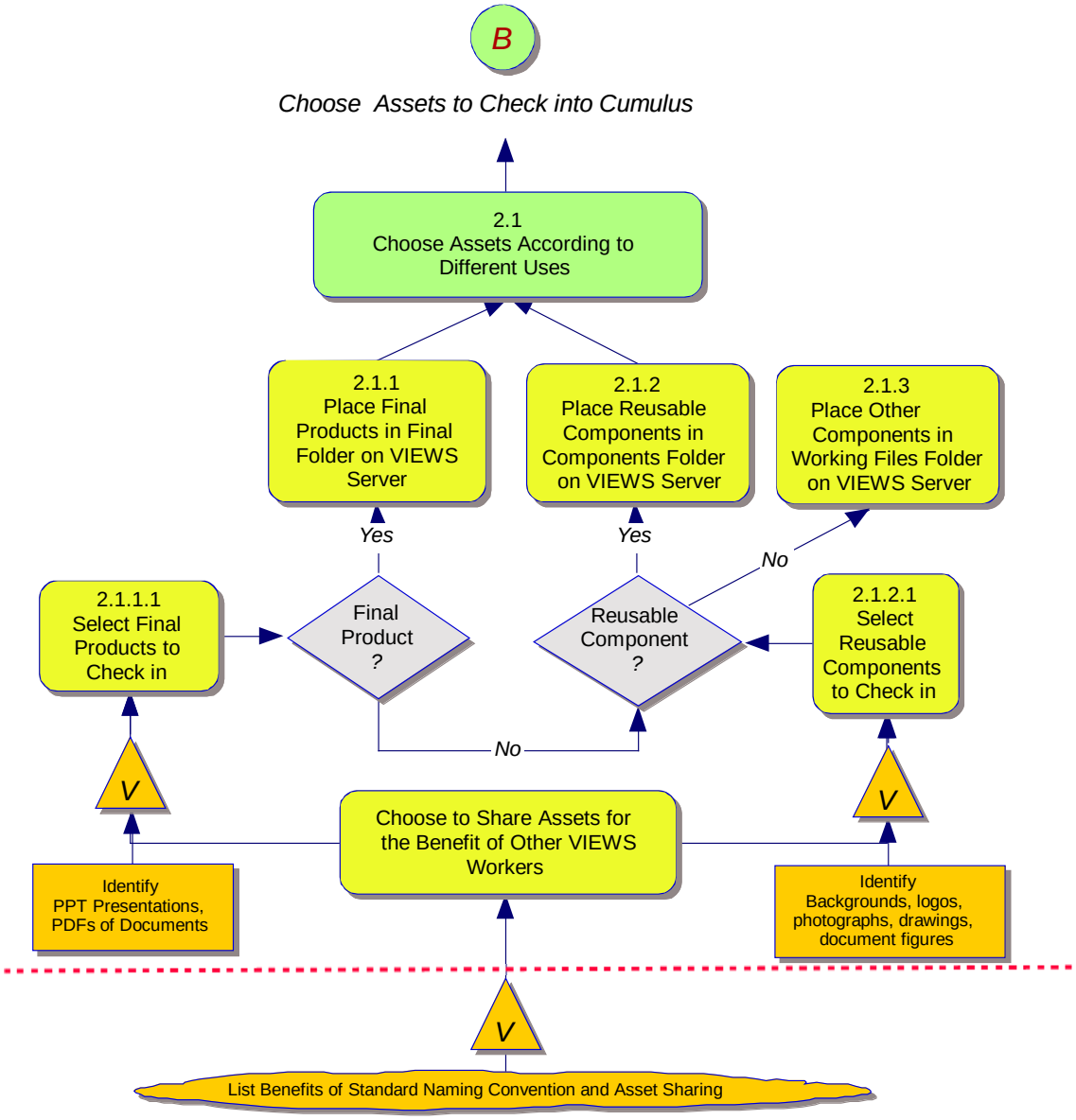

Figure 4: Subtasks and Subordinate Skills for Step 2

3. Assign key words to selected files in metadata dialog box of each native application (Figure 5):

   Define function of key words.

   Define different types of metadata.

   Understand relational database concepts.

   Choose appropriate key words (e.g., by copying slide title).

   Be able to locate metadata dialog box in all applications and copy or enter key words.

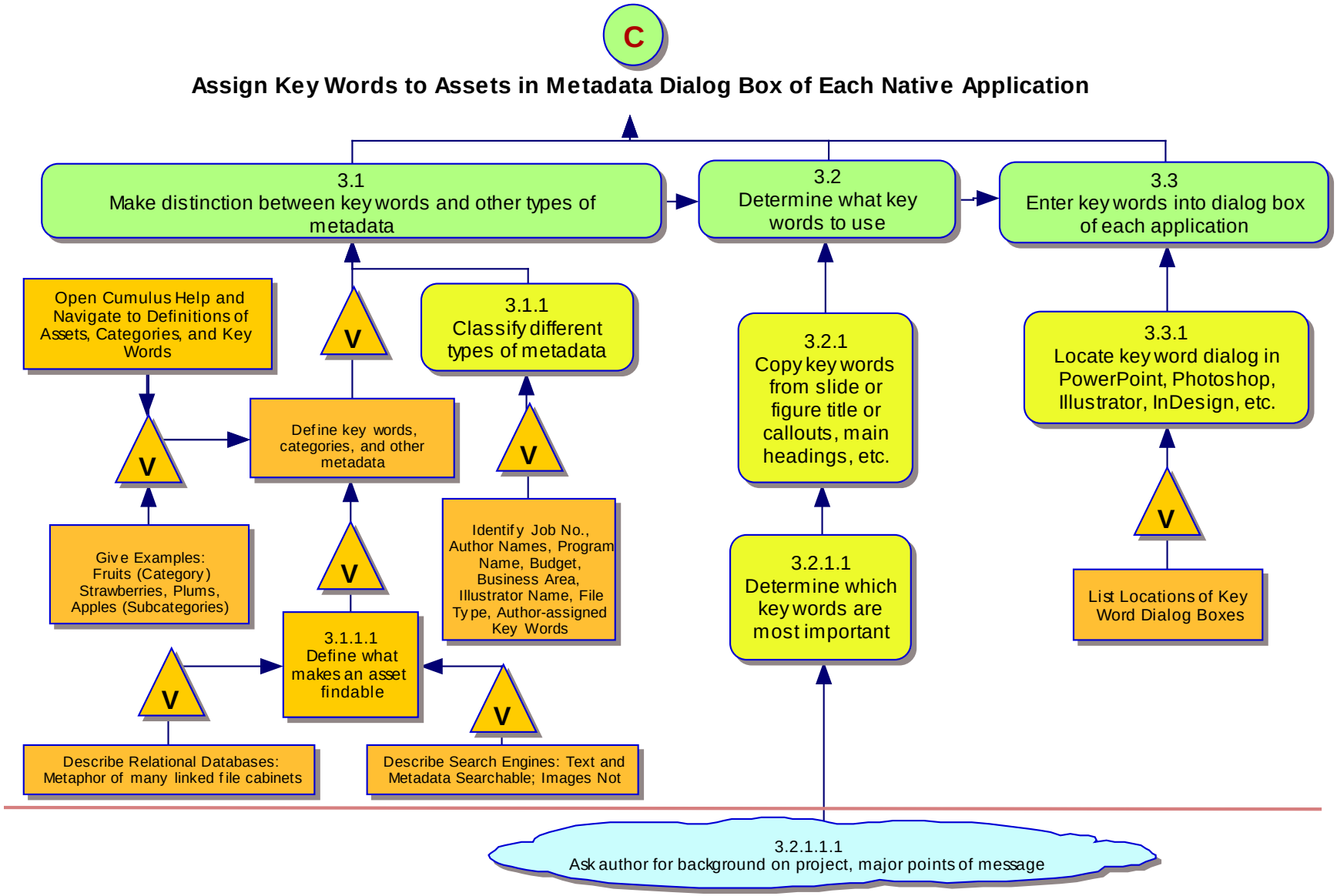

Figure 5: Subtasks and Subordinate Skills for Step 3

4. Check selected files into Cumulus (Figure 6):

   Log into Cumulus, open thumbnails view and category list.

   Choose which categories to apply to assets.

      Review content and analyze proper categories.

      Explain function of categories.

      Describe concept of categories (e.g., Apples Oranges Pears = Fruits).

   Use the drag-and-drop function to bring assets from VIEWS server into Cumulus CHECK IN box.

      Follow check-in procedure in Cumulus.

   Select appropriate content categories in Cumulus and drag assets into selected categories (e.g., backgrounds).

5. Test check-in by using content categories and key words to search for assets (Figure 7):

   Demonstrate ability to search by category and key word.

      Decide which categories and key words to search.

      Use Cumulus category and key word search tools.

2.2.2 SUBORDINATE SKILLS ANALYSIS

Most of the subordinate skills that learners need to achieve the performance objectives for using Cumulus are intellectual (i.e., ability to use a tool or process); some of those intellectual skills require verbal information as a foundation. For example, subordinate skills for Step 1 are naming job components using a consistent naming convention (intellectual) provided on a cheat sheet (verbal information).

Note that in Figure 3, the subordinate skills for Step 1.3 (Store Assets Using Publications Folder Structure) are not included because they are similar to those for Step 1.2.

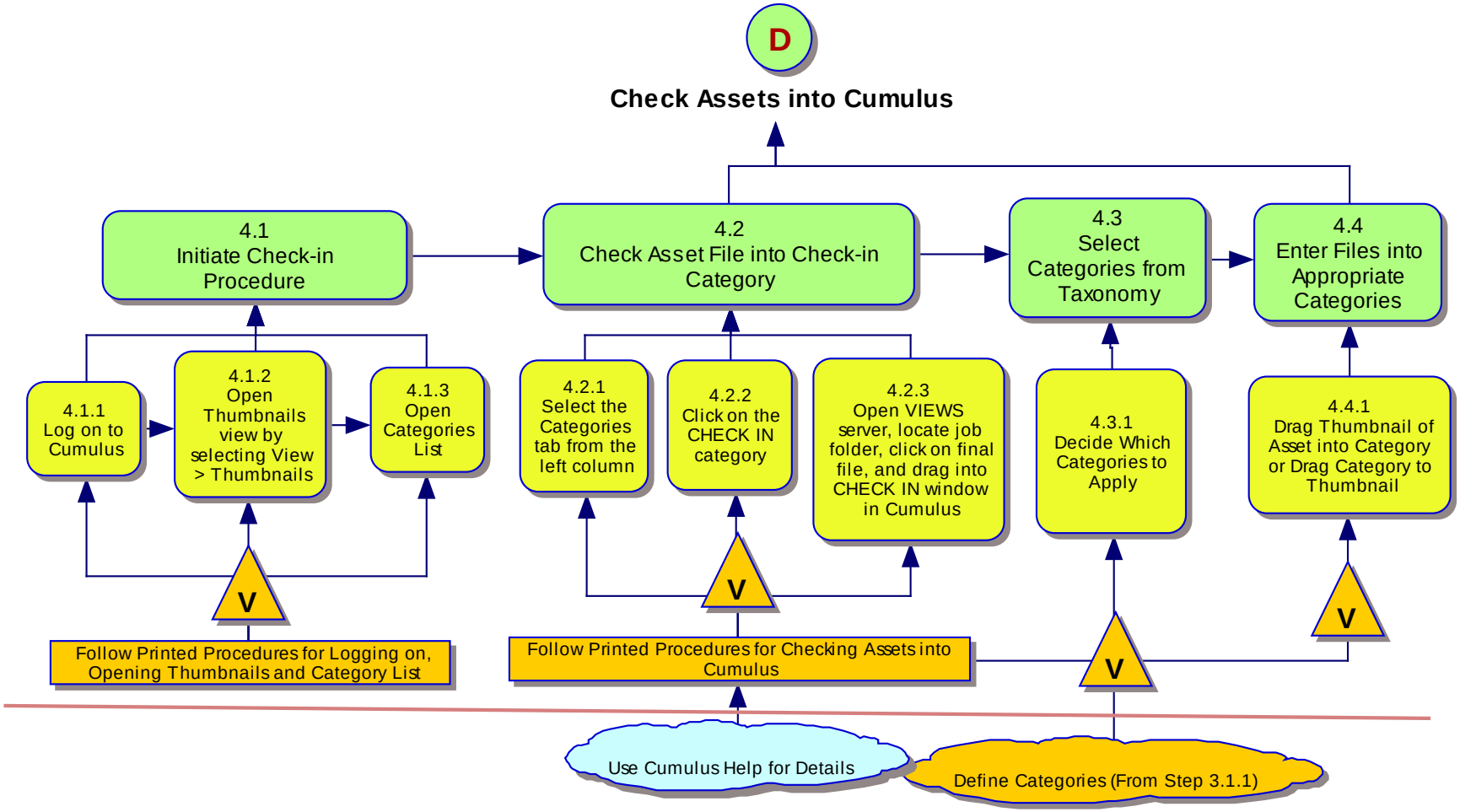

Figure 6: Subtasks and Subordinate Skills for Step 4

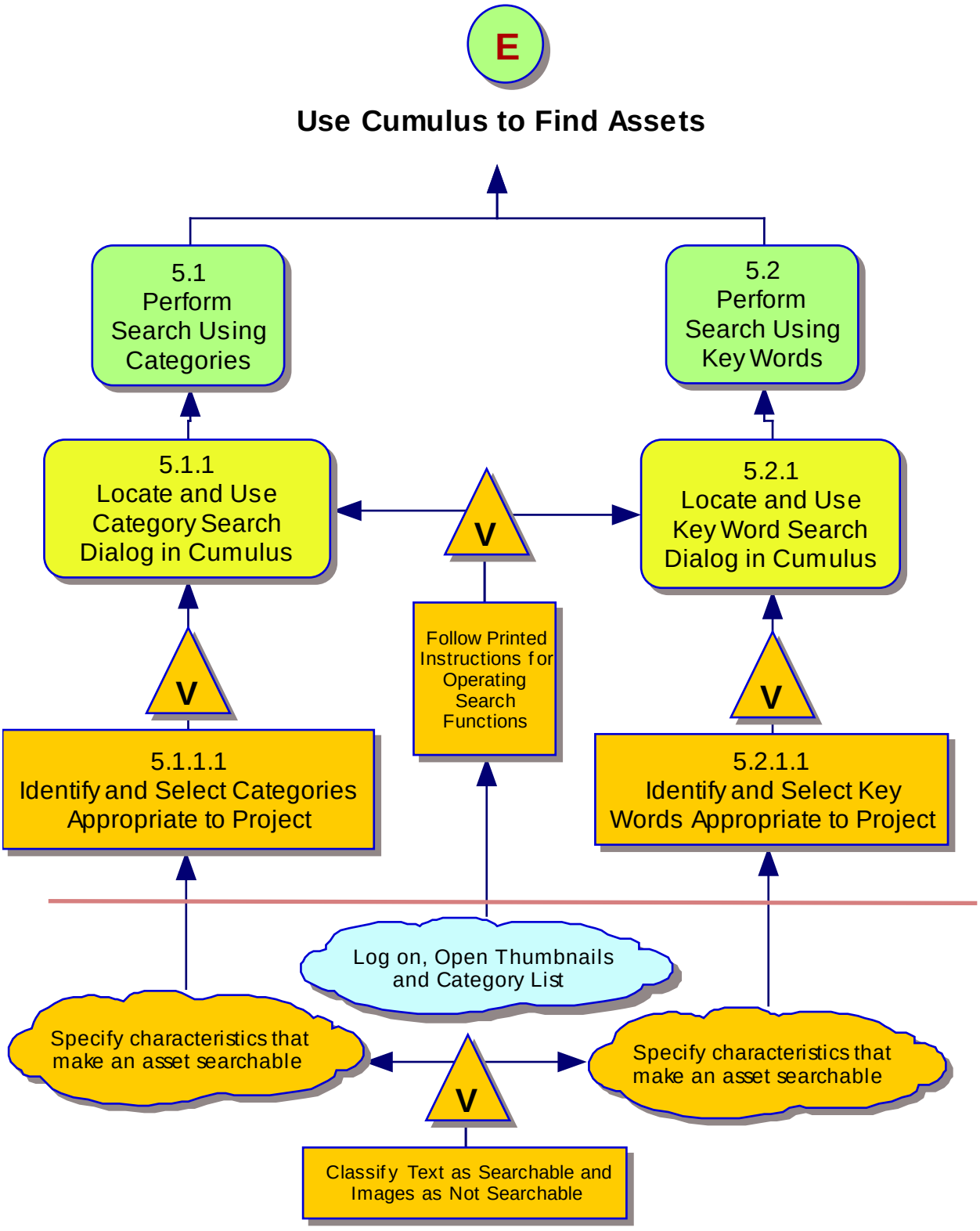

Figure 7: Subtasks and Subordinate Skills for Step 5

2.2.3 ENTRY-LEVEL BEHAVIORS

"Entry behavior" is a term instructional designers use to describe foundational knowledge below the subordinate skill level that learners need to possess (and demonstrate in a way that can be observed) before they can understand concepts or perform procedures that are the focus of the instruction. Most entry-level behaviors needed for learning how to use Cumulus are required for employment as a VIEWS staff member. For example, in Figure 3, all learners have already demonstrated that they know how to name files and folders in applications and operating systems, so that is identified as an entry-level behavior, shown below a dotted line. For convenience in diagramming, some steps include as "entry behaviors" skills that were required to perform a preceding step. For example, in Figure 3, Subtask 1.1.2 becomes an entry behavior for the subtasks in Step 1.2, because once learners have demonstrated ability to perform Subtask 1.1.2, that skill becomes a prerequisite for performing subtasks in Step 1.2. Section 4.1.1 describes the target learners and identifies entry behaviors they already possess or may need to use Cumulus.

2.3 Learner and Context Analysis

2.3.1 THE LEARNERS

2.3.1.1 *Entry Behaviors*

The learners for this set of instructions are graphics illustrators and designers who produce presentations, animations, displays, and web sites, and desktop publishers, who produce documents such as graphics-intensive reports and brochures. Appendix A, which is a list of baseline prerequisites for employment on the VIEWS staff, defines the entry-level behaviors the staff members can already demonstrate. None of the learners has prior knowledge of Cumulus; instruction will have to present a considerable amount of overview and background to them to provide context, definition of terms, and orientation to the features in Cumulus they must know how to use.

2.3.1.2 *Learner Profiles*

Learner profiles were developed from interviews with VIEWS staff, review of resumes posted on APL's enterprise content management (ECM) site, and through observations made in the course of working relationships. Most learners are college educated, some at the graduate level. A few are high-school graduates who have extensive professional experience, have attended advanced training courses in computer applications, and may have completed some graduate-level course work. All have been working for at least 5 years producing graphics and publication products.

Although most staff members are eager learners of new applications and tools that might enhance their creativity, some staff may have negative attitudes toward the need for highly structured naming and archiving procedures and may be out of their comfort zone in conceptualizing verbal definitions of terms (e.g., assets, key words, categories).

Instruction will require a combination of procedural guides that include illustrations, group interactive training sessions, and one-on-one training sessions with the instructor to encompass the range of audience members' willingness to participate. To develop positive attitude among all staff members toward using consistent conventions and sharing assets staff members have created for the benefit of VIEWS as an organization, Steps A and B (Figures 3 and 4, respectively) include attitudinal instructional goals.

Although the graphics staff members are visual rather than verbal thinkers (as they have expressed in interviews), all learners are verbally articulate, with written communications and grammatical skills that vary from basic to advanced. Those who are most visually oriented may be less enthusiastic and receptive to verbal descriptions. Most illustrators are academically motivated, but their area of expertise is visual expression more than verbal, so cognitive processes requiring making distinctions between key words and categories and deciding what descriptors to assign to an asset may require extra reinforcement for some staff members.

2.3.1.3 *Learning Challenges and Domains*

Knowing how to use Cumulus will require the following:

- Understanding (and accepting) the importance of using a consistent filing and file-naming procedure (intellectual and attitudinal learning domains)
- Mastering basic concepts of what a relational database is and what makes an asset searchable (verbal and intellectual domains)
- Demonstrating a firm grasp of definitions of terms (e.g., asset, category, key word, and metadata) that have particular meanings in Cumulus (verbal knowledge)
- Operating competently in the Cumulus interface (intellectual domain)
- Using the search features of Cumulus to find particular assets (intellectual domain)

Higher-level intellectual tasks include determining which assets learners should check into Cumulus and choosing useful key words and category descriptors. Category and key-word selection is the most advanced and challenging aspect of the instruction. Learners must be able to make distinctions between descriptors, judge whether a particular category is important enough to be included, and choose unique key words that describe individual assets. Learners will also have to use judgment in identifying which assets to include in the system. Users will not need to enter every component of a particular product into Cumulus. Learners will have to decide which assets will be most useful to others. This will require some staff members to adjust their attitudes about making products they have created available for others to use.

2.3.2 THE CONTEXT

2.3.2.1 Performance Setting

Working in a production environment, all learners are always under deadline pressure, obligated to focus on creating products within allotted time. Because their time is intensely scheduled, they have difficulty setting aside time for self-training. Therefore, a structured training session must dedicate sufficient time for learners to practice using the Cumulus system. Management is willing to provide an overhead budget to account for the time needed for structured training sessions but reluctant to justify extra overhead for self-training.

In addition, the instructional design must include written instructional materials that are highly illustrated, succinct, and structured in small episodic units that learners can complete quickly. This will provide further attitudinal encouragement to staff members who will be more likely to participate cooperatively if they can complete modules between assignments. These materials also provide demonstration to management that instruction is formally documented and reproducible for training new staff in the future.

A trial period will be required for VIEWS staff members to adjust their work processes to using the new system, with opportunities for immediate feedback as they experience problems. They will need to begin using the system by a certain date (e.g., beginning of the month), and may need immediate help before they can proceed with some processes. The challenge will be in providing training feedback that can mesh with their production schedules. Having an instructor available on call to answer questions as they arise will improve chances of success because if staff members can get prompt answers during time they have available between production deadlines, they will be less likely to postpone learning the procedures because of scheduling conflicts.

Graphics and DTP staff work at individual workstations with a standard complement of tools available to them (including Adobe Creative Suite and Microsoft Office). However, not all staff members are equally expert at all applications; each staff member has a specialty. Instruction includes identifying key word dialog boxes in all applications; staff members who do not routinely use certain applications may need detailed verbal instructions or assistance locating the dialog boxes. Instructional materials will include tips on where dialog boxes are located in each application.

Because all staff members work in close proximity to one another, the context is a natural learning environment in which workers usually exchange ideas and freely give each other tips on new techniques and shortcuts in how to use various applications to create different kinds of products. Being able to ask coworkers questions about the procedures may help facilitate learning them.

All learners have access to both Macintosh and Windows-based computers (many have both at their workstations). Although Cumulus is a cross-platform database and is supposed to have identical function on Macintosh and Windows machines, the

information technology (IT) staff has not yet solved limitations on the ability to import assets using Macintosh machines. At the outset, until IT staff can solve those problems, everyone will have to use Windows-based PCs to check assets into the system.

APL is planning to implement an enterprise content management system (ECM) in phases over the next few years, so the instruction in Cumulus and procedures for archiving work will help introduce staff to the concepts needed to participate in an ECM. The planned instruction will help staff “get an edge” on using ECM systems by giving them experience organizing their work consistently, following standard archiving processes, and using a search and retrieval system as part of their daily workflow. Management needs to be convinced that participating in the future ECM will not incur unacceptable costs; learners already familiar with Cumulus procedures will have a richer layer of entry-level behaviors to facilitate learning the new ECM system.

2.3.2.2 Learning Environment

Initial instruction will occur in a conference room with an overhead projector that can project an online environment to demonstrate the Cumulus interface to everyone at once. An orientation session can include a tour of the Cumulus interface to familiarize learners with the features of the database and the steps required to check assets into the system. The instructor will distribute printed instructions during the orientation session in the conference room, and will present several examples of checking in different kinds of assets to step through the procedures during the conference room session so that learners can ask questions. Hands-on training in a computer room is a recommended option; if learners can complete some practice exercises during the initial training session, they will be able to use the system sooner, which may justify the extra expense of renting the computer training facility for a day.

Cumulus will be installed on all learners’ workstations to allow them to begin using the system right away. Learners must use the printed instructions [available in paper and Portable Document Format (PDF)] to learn the check-in procedures at their individual workstations and begin using them immediately after the orientation session. Learners will use the procedures for a two-week trial period and attend a follow-up session at the end of the trial period.

The instructor will need to be available to answer questions during the ensuing two weeks and should schedule training time with each individual to provide coaching and reinforcement. The follow-up training session will take place in the conference room (or computer room) two weeks after the orientation to troubleshoot any difficulty learners may have encountered.

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