

GroupWise Supplemental Instruction Project

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Background and Introduction

The Department of Fish and Game has well-developed centralized training, but little incentive is given to its employees to utilize this resource. Prohibitive travel distances, lengthy class times, and training outside of the performance context are just several obstacles facing training and development staff. The GroupWise supplemental instruction project aims to fill the current gap in instruction by letting employees train in place at their desk with shorter instructional modules that are contextually relevant to the daily work that they perform.

Software training in the Department is not interwoven into job expectations.

DFG is not particularly proactive in training new employees on how to gain and maintain proficiency on software and hardware. There is no mandated computer training for new employees, and training offered by the Office of Training and Development (OTD) is mostly held in Sacramento. Time for training and travel is compensated, but there is a general agreement among staff and supervisors that work duties must be prioritized ahead of training.

Software training is off-the-shelf. It is not customized to the needs of the Department.

OTD does not create trainings that cater to software-specific needs of smaller offices within the department (i.e. internal financial or personnel tracking software), or for that matter, generalized trainings that have contextual relevancy within the department (a generic business example Thompson training is used for Microsoft Access, even though Access is used for developing biological tracking applications in the department).

Software is not frequently updated on Department computers and/or the user interface has not undergone significant revision. Training conducted remains relevant for several years.

It is important to note that software lifecycles in the Department far exceed private sector guidelines. As an example, computers running Windows 2000 and Office 2000 are still widely used. Novell's suites of applications, GroupWise and Netware, have retained the same look and feel for the past decade despite several major versions being released. This makes the development of training cost-effective over a longer period of time.

Performance Analysis

Summary: The productivity of DFG suffers because end-users of Department are inadequately trained on the software necessary for them to carry out the duties assigned to them. (Note: I am using the term "end-user" when referring to non-IT staff Departmental employees, which are the target population for the proposed training).

DFG does not have a "culture" of software training: there is no entry training, no periodic training, and no strategy for work coverage during training. DFG does not develop training responsive to the specific needs of its specialized workforce: OTD uses off-the-shelf software instruction for off-the-shelf software. No consideration is given to internally developed software

or customized trainings for biology-oriented applications. DFG does not empower its end-users by taking a reactionary response to instruction: workstations are locked down, specific instructions are given to solve problems when they arise which end-users are unable to place into a larger educational context. Another result is that end-users develop a straight-line mentality of software operation: A->B->C to get a specific task done. If an anomaly occurs, the end-user dials the helpdesk.

Analysis Instruments

There are two instruments of analysis that will work best in this situation to determine how hindered end-users are by the software they use:

Document Analysis from Help Desk Requests

The first instrument is document analysis in the form of analyzing trouble-tickets submitted to the help desk that show evidence of user error or confusion due to inadequate training. Sometimes these tickets are classified as such, but the entire collection of tickets submitted since the inception of the database (early 2006) should be analyzed for evidence of inadequate training.

Remote Observation of User Habits

The second instrument is unobtrusive observation of user habits when carrying out common tasks to identify inefficiencies in workflow. Users screens can be monitored remotely and observed, however there are also software packages that can measure the overall distance the mouse travels between commands (GIMP UI project), which could be measured against the performance of a well-trained and frequent user: a member of the IT staff, for example. The outcome using either technique would result in a percent deficiency. For example, 30% of all user-initiated tickets submitted to the help desk are the result of user error due to inadequate training. For the workflow efficiency, we might find when comparing well-trained users to standard end-users that well trained users move the mouse 20% less distance or use 10% fewer steps to accomplish the same task. The “should be” or desired outcome upon successful implementation of training could be expressed in terms of a 20% reduction of “user-error” trouble-tickets within a year, or demonstrated proof that 95% of employees are performing at the same rate of efficiency as the IT staff up from a previously observed 85%.

(See Appendix A: Analysis Instrument: Remote Observation Scoring Sheet)

Other Analysis Methods

Focus groups and interviews are useful tools in carrying out a performance analysis, but one must do this in a manner that does not require interaction or disruption of the daily duties of other employees. In our current work environment, we will only have the opportunity to interview staff in the formative and summative development stages of this project.

In addition to training of the end-users, the IT staff must better support the continuing educational needs of the end users by being available to coach users through training sessions

when needed. Management must also make clear work allowances for training so end-users do not worry about falling behind while undergoing periodic training.

Training Needs Assessment

Goal Statement: Non-technical staff within the Department of Fish and Game will demonstrate proficiency of standard and specialized Department software in their daily jobs on par with or slightly below the technical staff through regularly scheduled context-relevant interactive training taken on their Department issued computer.

Addressing the Performance Gap

Based on the analysis of trouble-ticket requests submitted to the IT department, IT staff spends a significant portion of its time responding to complaints that are categorized as “user error.” This takes up time and resources of the IT staff, and inhibits productivity of the rest of the staff who are at a work standstill until their confusion can be resolved. Additional analysis has concluded that end-user efficiency in operating software lags far behind that of IT staff.

Training: An Effective, Cost-Efficient Solution

In both areas it is thought that supplemental training can lessen occurrences of user error and increase efficiency. In comparison to changing behaviors via incentives or discipline, union rules in the workplace prohibit overt “carrot and stick” approaches. Even though staff time taken to develop training will be expensive because of the resulting overtime, turnover in civil-service employees is low and resistant to fluctuations in the economy;¹ therefore successful training has the potential for a significant return on investment (ROI).

Target and Tryout Learner Groups

The target group of learners will be all Department employees statewide outside of the IT staff. The tryout population that will initially be trained on a regular basis will be employees in the Department’s office in Santa Cruz. This tryout group will receive periodic training after the formative and summative evaluation stages of development, which will include staff from all geographical regions and administrative areas. Most employees have been with the department for 5 or more years and have experience with Departmental software but typically take a straight-line approach: they know specific methods to accomplish specific tasks. If a new task is demanded of them or an unexpected event occurs, the employee often finds him or herself unsure of how to proceed.

Training Priorities

The training priorities are as follows:

- The training modules should familiarize end-users with the full potential of the software they are using on a day to day basis in a familiar context.
- The training should stress the most efficient ways to accomplish repetitive tasks.

- End users should develop multiple ways to accomplish the same task and basic troubleshooting to prepare them for the inevitable variability of real-world working conditions.

Limited Scope of Training

This needs assessment and subsequent design of instruction will focus on one piece of software, GroupWise. GroupWise has been chosen because it is an off-the-shelf piece of software that OTD trains end-users on using Thompson instructional manuals. GroupWise is used by every Departmental employee for e-mail, task prioritizing, calendar scheduling, and document sharing. It has also been customized to serve Department needs.

Learner Analysis

Composition of Target Learner Group

California State employees comprise a fairly homogeneous group of individuals in regards to age, income level, and education, if federal employment statistics are any indication. Employees are on average 45.6 years of age, having an average of 16.6 years experience working within the government. 40% of employees are college educated or greater.² All Department employees possess basic computer literacy skills as follows: basic competency with the GroupWise e-mail system, basic competency with the Microsoft Office suite of applications (Word, Excel, PowerPoint), and limited database skill sets outside of data entry.

Employee characteristics in terms of assignments and time management diverge when describing employees at headquarters in Sacramento vs. field assignments. Department employees have specific duties at the rank and file level at headquarters rather than generalized assignments and limited autonomy. Assignments are given in intervals with sometimes daily progress requirements and their time is managed by supervisors rather than the employees themselves. These employees also spend the majority of their time working indoors in a cubicle. Employees assigned to the field in home offices or to field offices have more generalized assignments and less supervision. Due to many assignments being contingent upon environmental conditions or in response to catastrophes or adverse conditions, an average workday can range from a relaxed eight hours to continuous work over days or weeks in remote locations.

All employees are aware of the OTD, as e-mails are sent out twice a week with class offerings. Only a small amount of employees have ever attended a non-mandatory training, as evidenced by the infrequency of class offerings and limited enrollment. Employees have had a generally positive attitude of trainings that they have attended when surveyed post-instruction, as heard via informal conversation. Employees are used to a paper-based delivery system supplemented by guided instruction in a laboratory environment for OTD sponsored trainings. For smaller informal tutorials of specialized software compiled by IT staff, users are used to Word documents with screen captures, or if there are sudden urgent problems, detailed e-mails with step-by-step instructions.

Both classes of employees pose challenges to the design of instruction. At headquarters, employees need their supervisors to sign off on in-place training as it will affect the amount of time the staff has to work on regular projects. In the field, employees will need to exercise enough self-discipline to set aside time for training as they organize their own schedules.

Context Analysis

The goal of the training context is to match the performance context of the Departmental workplace. The performance context is working on a computer at headquarters, a field office, or a home office on a variety of Departmental pieces of software while managing multiple environmental distractions: other employees, the general public, animals, and perhaps small children if in a home office. All of these factors tax the continuous concentration a user can dedicate to the software. The training context should ideally be at the same computer and under the same conditions as the performance context. Rather than the traditional Departmental training model where an employee takes a single day to travel off-site to a training center to take lessons in a quiet, focused environment, these trainings should take place during the workday under the same conditions: the trainee can be interrupted due to a phone call or urgent need, the only difference being that the employee will avoid working on production software for the duration of the training. In the case of headquarters employees, time can be micromanaged and allotted unrealistically to a variety of projects which could potentially make training hard to schedule without full support of middle management making time in the schedules of their employees. In the case of field staff, training needs to be modularized enough so that skills can be retained when training is broken off for long unexpected periods of time before being resumed.

Task Analysis

Learners and Context:

The entry behaviors of the target population will be similar for e-mail: whether they are a new employee or have been with the department for years, they have had some experience using e-mail, and conceptually grasp the concept of composing, sending, and receiving e-mail, even if their training was not GroupWise specific. Entry behaviors may not be as similar for other components of the GroupWise suite: late adopters of technology are still using pre-computer methods of task management, document management, and planning: indeed, the Department still issues every employee a bound paper planner and to-do list, a filing cabinet, paper, pens, and pencils.

The target population will have prior knowledge of the topic areas taught: namely, GroupWise is responsible for electronic communication and time management within a large organization. The most helpful prior knowledge, at least on a conceptual level, is how large organizations communicate. This will help the users better understand the necessary complexity involved in taking full advantage of the GroupWise system: the hierarchy, the way teams are formed and tasks delegated, the way a shared calendar can help determine total resources during a given period of time.

The instructional context will be nearly identical to the performance context: employees will undergo training at their own computer with software that closely mimics Departmental functionality. For example, a GroupWise lesson to differentiate between the CC and BCC reply functions of e-mail would involve an actual Freedom of Information Act (FOIA) request with specific instructions on how to reply to employees of the Department (as BCC) and the requesting entity (as CC).

Instructional Goals:

At the end of the supplemental GroupWise training, users will be able to accomplish three main goals in regards to using GroupWise software. The first is to be able to explain and use the major functions of the GroupWise Program: calendar, task manager, e-mail program, and document manager. The second is to demonstrate increased efficiency in doing repetitive tasks in GroupWise, including the ability to accomplish the same task in several different ways depending on the context. The third goal is an ability to methodically troubleshoot (to a certain point) issues that may arise during routine operation of the GroupWise program. This third goal has the potential to transfer to other Windows applications such as Microsoft Office, as it involves investigation skills that are not proprietary to GroupWise.

Document Analysis and Remote Observation:

In order to determine the performance gap between proficient GroupWise end-users and typical employee usage, two methods were used. First, document analysis was used: based on the analysis of trouble-ticket requests submitted to the IT department, IT staff spends a significant portion of its time responding to complaints that are categorized as “user error.” This takes up time and resources of the IT staff, and inhibits productivity of the rest of the staff who are at a work standstill until their confusion can be resolved.

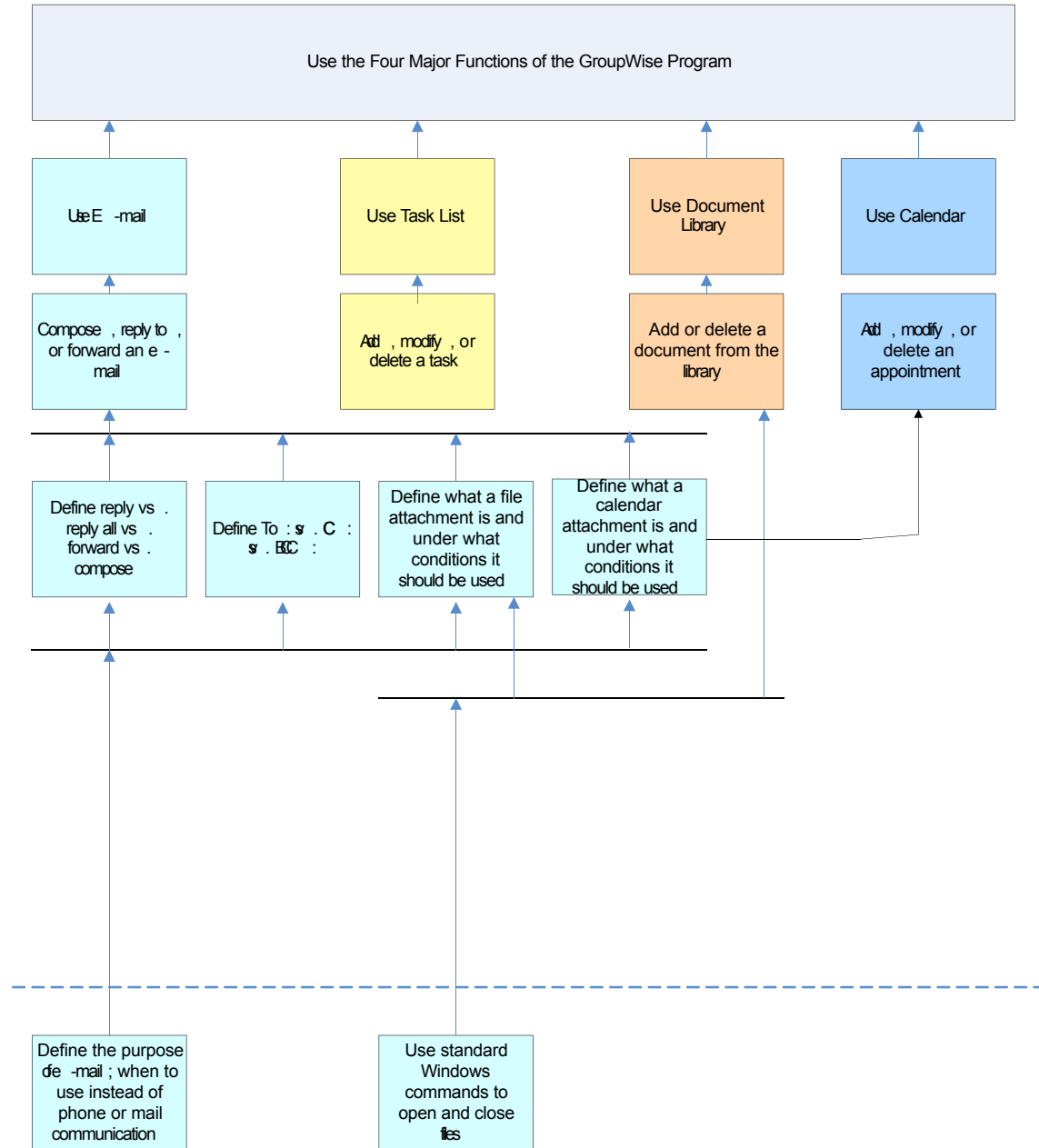
Second, remote observation was used: using remote computer viewing software, end-users were monitored as they used the GroupWise software. The amount of steps they took to carry out a given task were counted, along with their chosen method (menu, context menu, or keyboard shortcut), and time-per-task. These remote observations were compared to the remote observations of proficient GroupWise end-users, which were a selected subset of the IT staff, and to usage patterns common to Windows applications in general published by Microsoft³. Differences in technique and increases in time-per-task were observed.

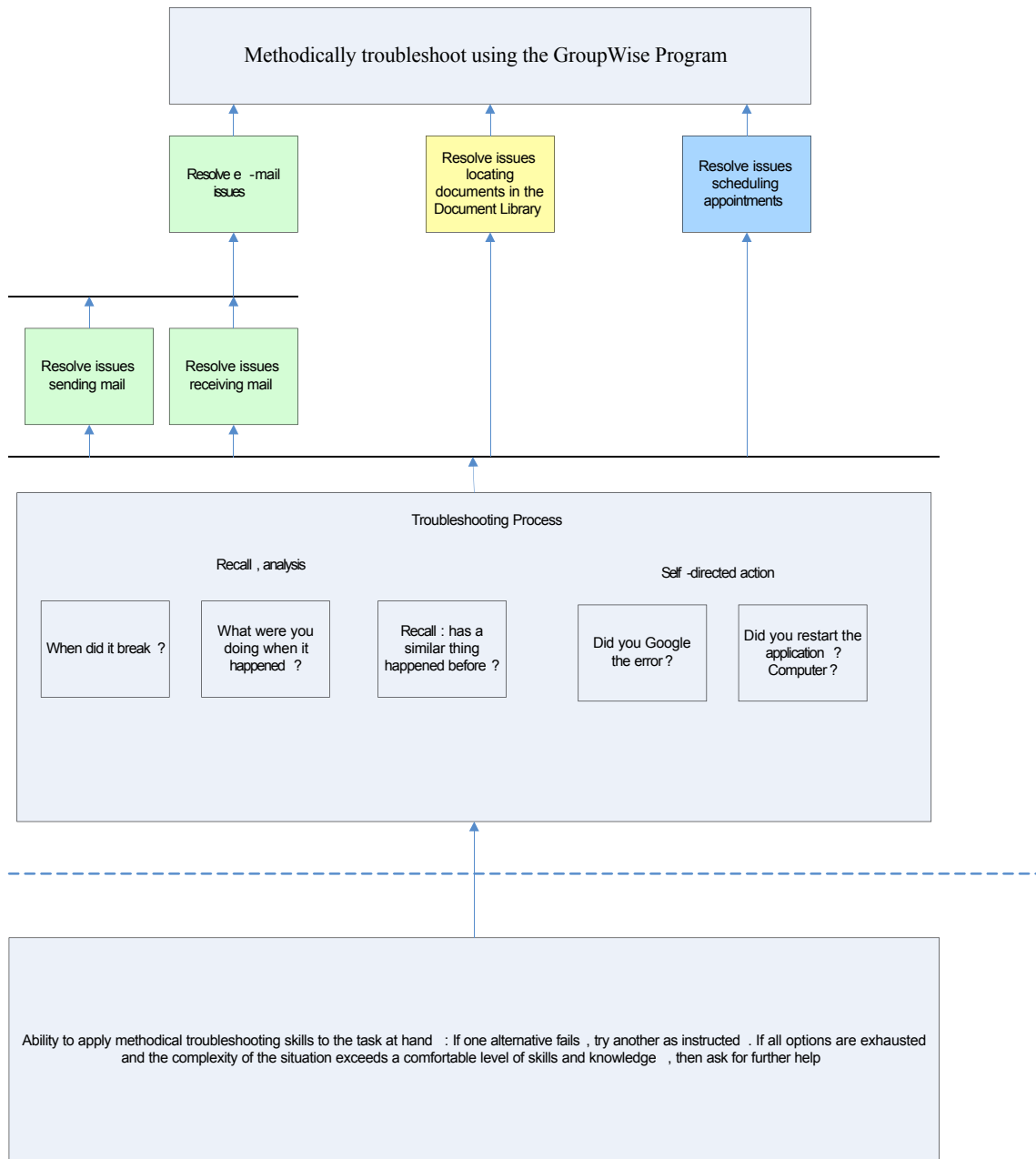
These two methods of information gathering were chosen because they were minimally disruptive to the employees and were still based on real usage behavior. Interviews and surveys could have also been useful tools for the task analysis, however it has been shown that in self-reporting skills and behaviors, subjects tend to both report what they believe a researcher is expecting from them and report what reflects well upon their ability.⁴ This self-reporting bias could yield inaccurate data on the cause of lack of software proficiency. In light of these potential pitfalls, however, we will be using surveys to self-report user confidence during the summative and formative evaluation stages of this project.

Entry Behaviors:

According to common boilerplate templates used in recruiting employees to the Department, the employee must have “knowledge of...computer operations.”⁵ In practical terms, this means expected basic proficiency in word processing, e-mail, and internet usage. GroupWise is not as widely used as Microsoft Exchange by a 3 to 1 margin⁶, therefore even if employees enter into service with the Department with e-mail experience, they typically do not have *any experience* using GroupWise. Experience with any Windows applications, however, is useful in learning how to use GroupWise, as the program menus, shortcut keys, and context menus behave in a similar manner.

Goal Analysis (Hierarchical Approach):





Instructional Media and Delivery Methods

The software and delivery methods used to present the instructional material will be described first as the lesson design strategies are built around the capability of the software.

The software used to develop the training is capable of capturing screen actions and voice narration via a microphone, along with detecting where users click or type in the instructional program itself. This can be used to simulate the action of a piece of software in the training, or provide a non-interactive video-tutorial. The training is presented in a user's web-browser, with a play and pause button at the bottom of the screen. I will use these capabilities in four ways:

- Non-interactive instruction:
 - I will display a PowerPoint slide of the concepts being taught, and then advance the slides while I narrate what the slides say.
 - I will demonstrate a technique using GroupWise while simultaneously narrating my actions. My actions--the movement of the mouse and the response of the program--will be captured on screen and then played back in the tutorial.
- Fully-interactive instruction:
 - The user will be asked to demonstrate a technique previously taught in a non-interactive way. By designating "hot" and "cold" spots on the screen, the instruction will advance *only* when the user clicks on the right or "hot" part of the screen, or types the correct entry into the prompt. A click or other response on a "cold" part of the screen will result in a message "incorrect, try again" or a hint "try again somewhere closer to the top of the screen" along with a "cheat" button after the third unsuccessful attempt in order to advance the instruction without undue frustration.
- Partially-interactive instruction:
 - The user will be prompted to carry out a similar procedure on their actual computer. Once the desired result is achieved, for example, a confirmation message of an e-mail being sent, the user will return to the instructional video to continue instruction.

The two most popular software suites are Camtasia and BBFlashback. At \$200, BBFlashback is cheaper per-license than Camtasia, and the instructional file is output as a single Flash file that can be played in Firefox, Safari, or Internet Explorer, assuming that a current version of Flash is installed. The Flash file can be compressed to save bandwidth, should it need to be loaded over a slow connection. BBFlashback does not support "hot" or "cold" spots, however, and would only be suitable for non-interactive instruction. Camtasia is \$400 for a single license, and outputs multiple files that must reside in the same directory for the instructional video to work correctly. This makes downloading over a slow link and portability more of an issue when taking the ease of delivery into consideration.

The instructional media will be entirely online and available on the Department's intranet. A user will need both a connection to the Internet and access to the Intranet. If they take the training at work this will not be an issue. If they are based out of a home-office, they will need Virtual Private Network (VPN) access, which would require additional software being loaded on to their computer.

The modules, units, and lessons will also be downloadable to their computer to complete offline.

Three Instructional Goals (referred to as “modules”):

- Use the four major functions of the GroupWise application
 - Use e-mail
 - Use task list
 - Use document library
 - Use calendar

- Methodically troubleshoot GroupWise issues
 - Resolve e-mail issues
 - Resolve task list issues
 - Resolve document library issues
 - Resolve calendar issues

- Demonstrate increased efficiency using GroupWise to manage daily office tasks
 - Understand integration between e-mail and calendar
 - Understand integration between e-mail and document library
 - Understand integration between e-mail contact list
 - Understand integration between e-mail and Microsoft Office

Instructional Sequencing Strategies and Activities

Content will be organized into training modules outlined by each of the three goals above. An overview will be presented of the material being taught in the module, followed by the instruction itself on each of the components of the major goals, followed by a review of the instruction delivered.

There are 3 modules in this course. A Module contains 4 Units, and each Unit contains 4 Lessons. The other modules, units, and lessons are omitted below, as they follow the same format. The following sequence demonstrates the nested format of instruction:

- Module Introduction: Using the four major functions of GroupWise (3 modules total)
 - Unit Introduction: Using the e-mail function (4 units per module)
 - Lesson: Composing e-mail (4 lessons per unit)
 - Lesson: Using BCC, CC
 - Lesson: File attachments
 - Lesson: mailing groups

- Unit Conclusion: Summarizes major points of lessons
- Module Conclusion: Summarizes units

Because there will be 16 lessons per module and 4 lessons per unit, the introduction and conclusion modules remind the user of the overall instructional goals, both from a high-level perspective (using the four major functions of GroupWise) and from an in-depth perspective (using the e-mail function). These pieces of instructional material will be non-interactive (as discussed in the “instructional media” section)—narrated overviews using a PowerPoint-style display of bulleted points and screen captures to summarize the major instructional points of each module and unit. The lessons themselves will have non-interactive, fully-interactive, and partially interactive segments.

A typical lesson “Composing E-mail” would be sequenced as follows:

- A non-interactive overview of the basic uses of e-mail, using a PowerPoint slide to show key uses within the Department and narration over the slide. This will make it easier for users with reduced visual acuity and for auditory learners to process the information.
- A non-interactive demonstration: composing and sending an e-mail. To make this more accessible to all learners, any narration spoken while the demonstration is taking place could be displayed in captions at the bottom of the screen.
- A fully-interactive segment: the user will be coached through composing an e-mail on-screen, in a simulated environment made possible by “hot” and “cold” spots in the software program. Again, the voice prompting could be captioned at the bottom of the screen in each step.
- A partially-interactive segment: the user will be instructed to carry out a sequence similar to the simulated sequence using her or his own copy of the GroupWise program, for example, composing and sending an e-mail to his or herself. The user will be prompted to return to the instructional program when finished completing the steps.
- A brief non-interactive review of the instruction will be presented on a PowerPoint slide. The lesson will conclude.

“What” Versus “How” Instruction and Assumptions of Subordinate Skills

The introductory and conclusion modules bring up a key difference between the two types of instruction that will be presented: the module and unit introductions and conclusions will show the user *what* they have learned or are going to learn (summary instruction); the lessons demonstrate *how* the process is carried out. This is particularly important in the last and most challenging module of the course, “Demonstrate increased efficiency using GroupWise” because the concept of integration between the different functions of GroupWise is more abstract than teaching “how to compose an e-mail.” For example, we assumed with the goal analysis that end-users would have a conceptual grasp of e-mail, however we did *not* that the end-user would have a conceptual grasp of GroupWise e-mail. In the integration lessons, users will need a solid understanding of GroupWise-specific e-mail functions to make use of the integration offered between that and the other core functions of the GroupWise software suite. The purpose of high-level

and lower-level summary instruction will be to help the learner bridge the gap between recently learned concepts, and more advanced functionality built upon those new concepts, essentially scaffolding⁷ in technological terms, wherein electronic instruction effectively takes the place of a tutor.⁸

Overall Instructional Length

Users will be given the option of completing as much as an entire instructional unit or as little as a single lesson, generally 5 minutes in length, in a single training session. This is to allow for the variation between individual skill levels on certain tasks. A secretary in the legal department, for example, may have extensive experience in the “Document Library” aspect of GroupWise, as most work related to legal matters is organized into a strict document structure. A biologist working out of a home office may not utilize any collaborative document management features because her or her job is very isolated from the rest of the department. In this case, e-mail might be the most extensively used component of the GroupWise suite.

Cross-culturally, the traditional length of a single lesson is 50.1 minutes⁹, however, given both the variation in the knowledge of end-users in the Department and the directive from management that this supplemental instruction be taken during the course of a workday, a 50 minute instructional burden is unrealistic for this type of training. By using 5 minute lessons with the option of completing a single unit (4 lessons) in a single session, users will be able to adapt their level of comprehension to the material being taught with less probability of frustration or distraction.

Sequencing

Users will not be able to choose the order of lessons presented, however, or skip any lessons, units, or modules in the course. If a user is proficient, she or he may choose not to pay attention to the instruction presented, but must still sit through the information presented. This is because even if the user considers him or herself an expert, she or he may carry out a task in a similar way to achieve the same outcome that is not as efficient as the way taught in the instruction itself. It may be equally as hard to change an established routine as it is to teach a new concept, but the eventual goal of this entire training program will be to ensure all Department end-users are trained at the same level using, or in some cases, made aware, of a standard set of procedures.

Combining Intellectual and Motor Skills

This instructional program uses audio, text, and video demonstrations to convey information on how to use GroupWise. The summary instruction at the beginning and end of each unit and module helps the user recall prior knowledge and “link[s] new content to existing prerequisite knowledge in memory.”¹⁰ However, users are being asked to learn new motor skills in addition to learning the intellectual reasons behind taking certain actions. The muscle moment required to compose a new e-mail message using only the mouse is a complex task, but it is done on a repetitive manner, and there is little variation in mouse movement each time the task is repeated. This is why the user is both guided through the exact physical motions of composing an e-mail in the simulation and also asked to compose an e-mail using his or her actual e-mail program. Each lesson will

consist of a demonstration of the action, followed by a guided tutorial in which the user participates in the action, followed by a freeform action.

Development Plan

Design Plan, Learner's Perspective, and Instructional Flow

The instructional objectives, as defined, call for demonstrated skill using the four functional areas of the GroupWise software suite. The blueprint of instruction will progress in a linear sequence, from introducing program functionality to covering basic troubleshooting methodology to introducing integration techniques between the components of the software suite. The breadth of instruction goes from broad to specific and back to broad—this is the movement of *instructional peristalsis*¹¹:



Essentially, the end-user (represented as a grey circle) is pushed forward through instruction ranging in scope from broad overviews (module, unit, and lesson introductions) and then to granular instructional activities (interactive lessons dictating individual steps) and then back to broad overviews (module, unit, and lesson conclusions). From the perspective of the learner, the drilling down into small segments of detail is not lost in the bigger picture of what the lesson is trying to accomplish.

Development Heuristics

- **Concreteness:** Each lesson demonstrates a specific skill needed to perform a function within GroupWise. Non-interactive segments couch that skill in a theoretical framework. For example, the Unit entitled “Understand integration between e-mail and calendar” not only explores how to manage a calendar through an e-mail account, but demonstrates the specific steps taken to automate the process.
- **Sequencing:** Basic conceptual knowledge is taught first, then more advanced topics are covered that are built upon these initial concepts. For example, composing e-mail and using the calendar are taught before the integration module.

Cognitive and Intrinsic Loads on the Learner

- After a non-interactive demonstration and an interactive demonstration, a user will have to memorize at least five steps for the final part of the lesson, approaching the maximum cognitive load in their short-term memory¹² demonstrating the concept on their live GroupWise system. However, the user may go back to the instruction and at any time and jump back to the beginning of the sequence to see the entire series of steps in order. They will *not* be penalized for this. Also, in an effort to reduce the intrinsic load, all lessons taught will be explained in relation to the functions similar to the ones being explained. For example, learning how to CC and BCC an e-mail will be taught sequentially under the umbrella segment explaining the “Composing e-mail” functionality of the program.

Components of Instructional Package

Existing instructional material on GroupWise is available in the form of written material but will not be used in conjunction with the supplemental training until formative evaluation is completed (see Conclusion for further discussion on this). Developing interactive video tutorials from scratch poses a potentially long-term investment in development time, but may be worth the effort if it can be proven that interactive video is more effective than off-the-shelf written instruction. The additional cost for development can be justified by the fact that no instructor needs to be present, and assessment can be built into the video tutorials. The instructional videos will be produced in-house. Although the narration and flow to the videos will be less polished than commercially available video instruction, it will be the job of summative evaluation to determine to what extent this difference is a detriment to the effectiveness of the instruction.

Implementation Considerations

The DFG workplace has not traditionally been a space for formal education

DFG, like many work environments, was not founded with a culture of learning in a formal instructional environment, but with a culture of learning by apprenticeship, informally, or outsourcing departmental instruction. This attitude has slowly been changing as the value of continuously educated employees has become known to the leadership with DFG.

Outsourcing law enforcement training

The best example of outsourcing education at the Department was the DFG warden academy, which used to be held at a community college. It was essentially a law enforcement training course—all information specific to being a game warden was presented as written material taught from the book—there were no specialized instructors for DFG-specific content, and no specialized activities for cadets. It was assumed that with sufficient training in law enforcement basics, a cadet could learn from a field training officer. Today, the role of field training officer exists, but the academy is now a specialized school that is hosted on a community college campus more for the sake of facilities—all warden classes are now taught by natural resource management instructors employed directly by the department.

Outsourcing IT training

Similarly, as recent as 5 years ago, the majority of the classes IT professionals within the Department elected to take were taught offsite by contractors using off-the-shelf instructional materials. One of the major complaints was that the knowledge gained in these classes did *not* transfer well to the performance context of the Department's work environment—predictably, most situations discussed in class were business-oriented, assuming a larger budget and staff and far different priorities, like revenue, than those of DFG. The results were IT professionals with a vast amount of new knowledge and a lack of clarity on how to apply this new knowledge to the problems at Fish and Game. The ultimate irony: the Department would then hire private-sector contractors to mentor career employees in how to use this new knowledge.

Adoption of the main instructional component: video instruction

As an educational concept, video instruction is nearly 40 years old.¹³ Adoption has varied across corporate, governmental, and educational training settings. There are several factors that will determine if this method of training is widely adopted outside of the small percentage of technological early-adopters:

- The Department must have buy-in from the Executive branch to participate in these instructional programs while at work and maintaining other responsibilities.
- The staff must feel that the instruction is useful and relevant. They must feel that taking the extra time—however little—will have a positive outcome on their working environment.
- Criticism of the training must be addressed and managed. Though the first stage of formative evaluation discussed below will gauge initial user reactions, the Department must also make an effort to address the spread of misinformation. Parameters must be made clear to the staff, particularly that this training will have no effect on salary or tenure.

Instructional Evaluation

There will be three phases of evaluation for the instructional material conducted: formative, summative, and confirmative. Additionally, before the summative evaluation field trial, a subject matter expert will review the training and make recommendations.

Formative Evaluation

Representative individual trial

A formative evaluation stage will take place followed by post instructional interview. A group of 10 individuals selected to represent a range of skills in using the GroupWise application will undergo the training. This will be clandestinely decided by reviewing the past year of GroupWise related tickets submitted to the helpdesk. These tickets will be parsed to determine the overall ability of the users, and from this a sample will be selected.

They will be clearly told once they have been selected that it is their role to evaluate the quality of the instruction. They are not being evaluated on their own skill level as they are being observed—we already did that. This test population will be encouraged to pause the training at any point and take notes on aspects of instruction that are unclear. In addition, their behavior will be observed, and notes will be taken as to the amount of times a video procedure is repeated or paused at length. They will then undergo a post-instruction interview to discuss specific benefits and drawbacks of the training.

Small group trial

After synthesizing information from the individual trials and revising gross errors in the instructional materials, a cross-section of 20 individuals throughout the department will be chosen—at this point it will be important to get a representative sample of the Department as a whole: people from different geographical regions (there are different management structures in each region), people who work in different environments

(headquarters, field office, home office), and people from different functional areas (administration, enforcement, biology). This is because our previous trial focused on making the instructional material appropriate for a range of skill levels. At this stage of evaluation, we are increasingly concerned with how the workplace environment affects the training. Before and after this group undergoes training, we will administer a questionnaire to rate their self-confidence in using the GroupWise program (*see appendices B and C*). The small group trial will be held in a conference room where the instructional materials developer will be present to explain that the instructional material is still undergoing revision and input into the quality and pace of the instruction is greatly valued. Unlike the individual trials, however, the field trial confidence surveys will be used to gauge if the material has raised the self-confidence levels of the users.

Field trial

In this stage of evaluation, the instructional video links will be e-mailed to an entire region or functional area of the department. Surveys to be taken pre and post instruction will be e-mailed out. The instructor will have little interaction with the learners other than evaluating the surveys.

The field trial may last a significant period of time in order for an entire department to complete the training. This is absolutely beneficial because during this time, help desk tickets can be re-examined and broken down by department. Even at this early stage in instructional implementation, we can quantify the impact of instruction when we compare help desk tickets related to GroupWise in relation to other departments that have not undergone the training.

Summative Evaluation

Subject Matter Expert Review

In this stage of evaluation, a GroupWise instructor from the Office of Training and Development will review the instruction for soundness in clarity, instructional technique, and completeness of materials. He or she will report their findings back to the instructional materials developer.

Field trial

In this stage of evaluation, the instruction will be distributed to another region than the field trial for the formative evaluation. The subject matter expert used in the previous stage will evaluate the surveys as they are returned. Additionally, he or she will interview select participants about their experience with instruction. This fresh perspective on user attitudes will be critical in determining the effectiveness of the instruction relative to what the SME generally works with—paper based instruction. He or she will report their findings back to the instructional materials developer.

Comparison to professionally produced instructional video

In this stage of evaluation, we have another method of evaluation at our disposal. We can find out how well our instructional video produced in-house compares to professionally produced multimedia instruction. Using EDULEARN's GroupWise instructional videos, we can compare user outcomes. Our videos are not professionally produced but are

contextually relevant. EDULEARN's videos are methodically written to be clear and concise, but they have been developed for a generic business audience. Pre and post instructional surveys and interviews will determine the advantages and disadvantages of adapting off-the-shelf material.

Confirmative Evaluation

If it is decided that the GroupWise supplemental training will be incorporated into Departmental training policy, the instruction should be tested at a future date to review and hopefully reaffirm its effectiveness. Testing methods will be identical to the summative evaluation field trial described above. There are two factors that could positively contribute to the long-term effectiveness of video training:

- As mentioned in the introduction, software lifecycles in the Department are as long as 5 to 10 years between major upgrades. The core functionality of GroupWise, as a product, has not changed in the past 5 years either, making instruction relevant for the long-term
- As younger employees are hired into the department, preferences for training might dramatically shift from paper-based to online—in this case, the GroupWise supplemental training would be posed to expand to cover the majority of the course curriculum, and not be used just to take users above and beyond the paper-based instructional.

Conclusions

Through recent observation of the Office of Training and Development classes, along with experience developing supplemental instructional material, valuable lessons have been learned about teaching effectiveness within the Department using existing materials and traditional day and multi-day classes.

Challenging assumptions about existing instruction and delivery methods

After writing performance objectives and developing assessment instruments, it at first seemed apparent that existing instructional material and delivery methods were inadequate to meet the goals set forth in the objectives, namely, to reduce end-user load on the Help Desk regarding GroupWise technical support. Existing training required time to travel off-site. Training wasn't context specific to the Department. Time to take the class was not woven into existing job expectations. However, upon attending recent Office of Training and Development (OTD) classes, it is apparent that such assumptions are not true:

- Job expectations vary by region. Some regions allow for generous time for training and travel, even if the end-user is working in a centrally located office.
- Lesson time is adequate to teach full courses on GroupWise. Most students in 8 hour training classes remained focused, based on their level of engagement with the materials, until the 6th or 7th hour of instruction.
- Instructors are skilled in adapting the off-the-shelf material to Department specific scenarios. For example, one instructor was taking care to illustrate each concept

with a running example of a hatchery facility's interaction with the various integrative concepts of GroupWise.

Challenging and time-consuming development of instructional material from scratch

In spite of all the advantages it was thought would be gained by interactive segments of instruction, formative evaluation has indicated that slow-paced and clearly worded video instruction was preferred over “clickable” segments. In terms of the time taken to develop interactive instruction, not only does a linear timeline need to be constructed as the user chooses the correct choices on the screen, but at each juncture in the tutorial, an error response also has to be created to alert the user to their mistake and given them the option of retrying the task. Therefore, it is 50% efficient to record non-interactive tutorials, as the error responses do not need to be coded.

The final solution: a hybrid course of instructor-led material followed up by self-paced video tutorials.

After discussions with an OTD teacher regarding the benefits and drawbacks of using Camtasia versus Thompson paper-based teaching material and instructor-led courses, a solution has been devised, pending management's acceptance of instructional video as a parallel form of instruction:

- Regular classes will still be taught with paper-based instruction.
- OTD management will emphasize that instruction will be adapted by the instructor “on the fly” to be specific to the performance context. He or she will use examples from common Department scenarios to illustrate concepts (some already practice this).
- For a randomly selected group of users that have completed the paper-based learning, a “completion of training” certificate will not be issued until at least one GroupWise supplemental training module is completed, in a period of time no greater than 2 weeks post-instruction.
- This test group of learners will be surveyed 1 month post module and paper-based instruction to gauge their confidence in GroupWise usage. Their survey results will be compared to survey results from a control group of learners that have had the paper-based instruction but have *not* been required to complete the supplemental training.
- The differences, if any, between the test and control groups will further gauge the effectiveness of the GroupWise supplemental training.

The results of this final stage of summative evaluation will determine whether or not the Department should invest more time in producing supplemental instructional materials. The results should also be segmented into age-groupings, as younger end-users may prefer content delivered in video-based methods over older end-users. Even if there is little significant difference between paper-based instruction and onscreen video-based instruction for the Department as a whole, this final evaluation provides a starting point for a completely new type of instruction, particularly as a new generation of learners comes of age in the Department of Fish and Game

Appendix A: Remote Observation Scoring Sheet

Guidelines:

The scoring of user efficiency in GroupWise is done in *sessions*. A session is defined as a continuous length of time that a user is working within the GroupWise application.

For this scoring sheet, we are only concerned with GroupWise sessions.

For each GroupWise session observed, note the following:

User: _____

Total length of GroupWise session: _____ minutes

Total distance of mouse movement (retrieve from GIMP session log) _____ miles

Observed instances of hotkeys used (program action when no mouse movement is observed) _____ instances.

User chose contacts via address popup ____ yes ____ no

User chose contacts via opening address book ____ yes ____ no

WPM typing speed (retrieve via GIMP session log) _____ WPM

Other observed proficient characteristics (multi-select, integration with calendar, shared address books):

Other observed deficient characteristics (open and cancel, hesitation, signs of frustration):

Appendix B: Formative Evaluation Self-Score Sheet (pre-instruction)

GroupWise Instruction Self-Score Sheet

Instructions: Before completing the online instructional material, please mark your confidence at performing each task below on a scale of 1 to 10 (1= Not Confident, 10=Very Confident).

Your responses remain strictly anonymous.

I know how to compose a blank e-mail message

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to address an e-mail with the BCC function

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to compose a task

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to delegate a task to another user

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to compose a calendar event

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to delegate a calendar event to another user

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to search for pending dialogue boxes

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to clear queued mail

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to edit incorrect quick address entries

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to save file attachments to a network volume

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how turn off QuickNotify

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to attach multiple documents to a single message

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to multi-select calendar events

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to create a vacation rule and activate it

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to delegate e-mail messages based on specific conditions

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to use "Hit the Road"

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to archive old messages to a network volume over the VPN

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

Appendix C: Formative Evaluation Self-Score Sheet (post-instruction)

GroupWise Instruction Self-Score Sheet

Instructions: After completing the online instructional material, please mark your confidence at performing each task below on a scale of 1 to 10 (1= Not Confident, 10=Very Confident).

Your responses remain strictly anonymous.

I know how to compose a blank e-mail message

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to address an e-mail with the BCC function

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to compose a task

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to delegate a task to another user

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to compose a calendar event

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to delegate a calendar event to another user

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to search for pending dialogue boxes

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to clear queued mail

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to edit incorrect quick address entries

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to save file attachments to a network volume

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to turn off QuickNotify

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to attach multiple documents to a single message

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to multi-select calendar events

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to create a vacation rule and activate it

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to delegate e-mail messages based on specific conditions

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to use "Hit the Road"

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

I know how to archive old messages to a network volume over the VPN

Not Confident 12 3 4 5 6 7 8 9 10 Very Confident

Appendix D: Instructional Link and Contact Information

Instructional files for the GroupWise Supplemental Instruction Project are located at:

<http://www.openbookconsulting.org/itec/groupwise/>

Content will remain at this location until southern Florida is submerged due to global warming.
(The server is, inexplicably, located in Florida)

Contact Miles Reed at miles@openbookconsulting.org or 831-295-0449

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