



**SCHNEIDER NATIONAL  
INTERACTIVE COURSEWARE LIBRARY**

***DRIVER SERIES:  
FATIGUE AWARENESS***

***PRELIMINARY DESIGN GUIDE***

*(5-18-95)*

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# **1.0 PROGRAM DEVELOPMENT**

## **1.1 PROBLEM STATEMENT**

### **PURPOSE**

The purpose of this project is to develop a 30 minute interactive CD-based training program on the topic of fatigue awareness for Schneider's 12,000 drivers.

### **GOALS**

There are two primary goals for this project. The first is for the application itself, and the second is for the CD technology platform that will deliver it.

1. The primary goal for the application is to have a measurable, and positive impact on the driving behavior of Schneider's 12,000 drivers.
2. The primary goal for the CD hardware system is to validate it as a cost-effective means for distributing truck driver education and training in the field.

### **PROBLEMS**

In order to satisfy the project goals, there are two important problems that will have to be resolved.

1. The first, requires us to pick our way through a daunting volume of content material surrounding the topic of fatigue. There is enough material here to easily fill a three to four-day seminar. However, to ensure drivers take the time necessary to view the application once it goes into the field, we must limit ourselves to an application approximately 30 minutes in length.
2. The second, but most difficult problem, is dealing with the collective set of dangerous attitudes and misperceptions about fatigue, held by the drivers themselves. Our research shows that truck drivers are not aware that their physical and mental abilities are reduced by fatigue—especially their ability to recognize the symptoms of fatigue in themselves.

## 1.2 RECOMMENDED SOLUTION

To solve the unique problems presented by this project, and to satisfy its primary goals, it will be necessary to narrow the focus of this application down to its most critical area. This not only reduces its scope to a manageable size, but it also increases the likelihood that some impact will be achieved from the very short contact the application will have with its viewers.

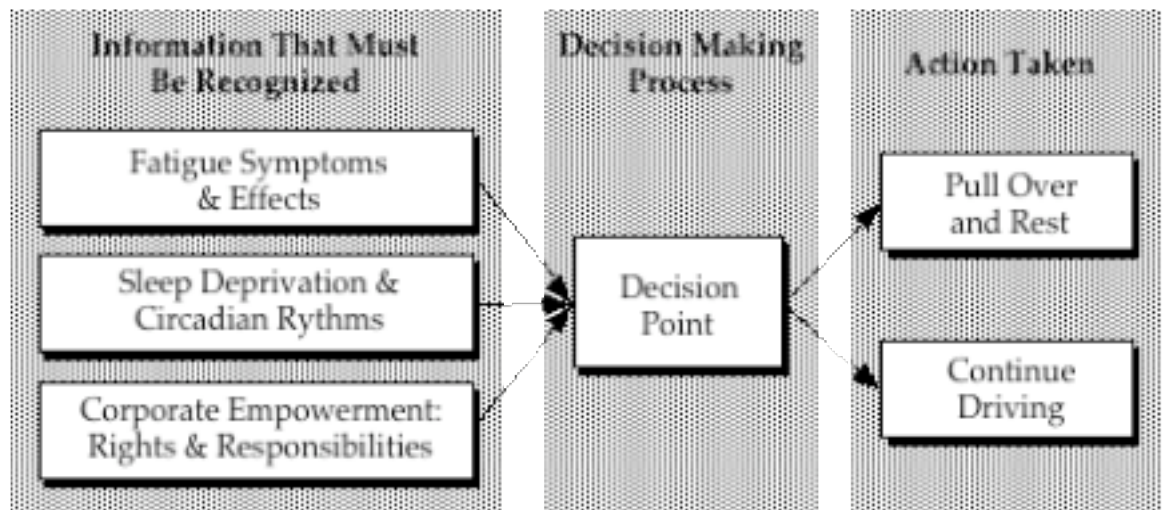
This critical area, is that point in time where drivers out on the road must decide whether to pull over and rest, or continue to drive. It is at this point where dangerous decisions are made, and significant risks taken.

Therefore, the objective of this application is not to try to *teach* drivers everything there is to know about fatigue, but rather to *empower* them with the authority to make better, lower risk decisions when they are affected by it.

Due to a unique characteristic of human fatigue, the focus of this application will also encompass a period of time before fatigue symptoms are easily recognizable. This is because fatigue itself reduces our ability to recognize its presence. Recognition may not occur until long after it has taken affect. Our ability to detect it, and make rapid and accurate decisions may be impaired for hours before we are aware of it.

### DESIGN APPROACH

As mentioned above, this application will be designed to help Schneider’s drivers make better decisions...and will focus on only one specific topic—fatigue. In our design approach, we will examine each aspect of the decision making process related to this topic.



While there are many aspects to the decision making process, these aspects can be encompassed within three basic steps: Factor Recognition, Making the Decision, and Taking Action (Fig. 1).

To help Schneider's drivers make better decisions concerning fatigue, they must:

1. Factor Recognition

- Recognize what fatigue is and how it affects them
- Recognize why the human body needs rest, how it gets it, and what happens when it doesn't
- Recognize the rights and responsibilities the Corporation empowers them with to make fatigue-related decisions.

2. Making the Decision—Based on an understanding of their own abilities and limitations, and a better understanding of fatigue data, they must carefully evaluate the conditions and situation, and decide whether to pull over and rest, or continue driving.

3. Taking Action—They must then be able to successfully and safely implement their decision. If their decision is to:

- Rest—They must know what procedures must be performed concerning themselves, the load, the client, and the company. (i.e. Notifying the dispatcher of the decision to rest, providing a revised delivery time, rechecking the customer's requirements for delivery, and making alternate arrangements if required.)
- Drive On—Performing self checks to verify they are in acceptable condition to drive, prepare for contingencies, plan more frequent breaks, (research to identify additional items here.)

## TREATMENT DESCRIPTION

The following is a preliminary description of the Fatigue Awareness application and how Schneider's drivers will use it.

### Sign-on/Log-on

Drivers (from here on referred to as learners) will sign on to the training system by entering their name and employee number at the initial log-on screen. An on-screen keyboard will be used for this purpose. A learner data file will be created to store this information, and the time and date will automatically be added. This file will be stored in the player's internal non-volatile RAM chip.

### Introductory Activity

This application's Introductory Exercises is a modern replacement for the traditional pretest. It's primary goal is to *prepare* our learners for learning rather than simply identifying what they might already know. What they already know is not important, what we want them to learn, is...and with only 30 minutes, we have to be very careful with how we spend the learners' time.

Our original intent was to create an Introductory Exercise that would allow learners to *discover* their reduced driving and decision making

abilities resulting from fatigue. However, this task would require an activity longer and more complex than would be appropriate for an introduction. Instead, we will leave this specific task for the tutorial sections and focus on the other introductory objectives for now.

Objectives for this Introductory Exercise include:

1. Introduce learners to the topic of driver fatigue and help them focus on the specific area of this topic we will be addressing.
2. Let learners know we understand and empathize with the difficult conditions and situations their jobs put them in.
3. Bring them to the critical decision making point this application focuses on. Once here, we want to help them discover, and be able to personally relate to, the difficulties and complexities surrounding the drive-versus-rest decision.
4. Begin to help learners discover that fatigue may prevent them from recognizing its symptoms until long after their driving and decision making abilities have been affected.
5. Provide an overview of the scope of content covered by this application and its organizational structure.

This exercise will center around a video scenario of a driver delivering a load. The scenario will need to be engineered with the help of the entire Schneider development team (Tom, Scott, Jane, Bruce, etc.) as well as a small group of experienced drivers.

As the scenario unfolds, our learners will see the driver deal with the myriad of situations and conditions that make their jobs complex, difficult, tiring, and stressful. They will see the driver gradually, and inevitably, become fatigued. The scenario will stop at a point where the driver needs to make a decision: should he/she continue to drive, or stop and rest?

Before describing what happens next, there are a couple additional characteristics that need to be designed into the scenario:

- The scenario must be engineered and shot so that the learners are able to recognize fatigue symptoms in the driver, but that the driver they are watching clearly does not.
- The conditions and situations that bring the driver up to the decision point must make the decision process very difficult for even the best drivers. Possible suggestions include:
  - Driver is within 1 hour of the destination
  - Driver is within hours of service but also within circadian danger periods (1am-6am or 2pm-4pm)
  - It is a JIT load—but to the learners eyes, the driver is clearly in bad shape

- The driver is preparing to do what he/she says always keeps them awake in situations like this (coffee, cold water on face, walk around rig, etc.)

When the video scenario freezes at the decision point, our learner will be asked what they feel the driver should do. We need to devise at least three options: one that includes a decision to drive on, one that includes a decision to rest, and one that includes a nap.

Development of the feedback to each of these options is critical. Characteristics of this feedback include:

1. Each piece of feedback will present both the positive and negative effects of the decision (in terms of level of risk, client satisfaction, long-term health & safety, etc.).
2. None of the options is to be either entirely correct or incorrect. This feedback will clearly illustrate how complex this decision really can be.
3. After making their first selection and hearing the feedback, the narrator will suggest they try one of the other two options. After selecting and hearing the second, they will be prompted to try the third as well. It is important that the learner discover that each of the obvious choices contains flaws. And at this point in the program, it may actually help if the scenario appears to be a no-win situation.

When finished with this introductory activity, the learner should:

- Be focused on the topic of driver fatigue...and specifically on the critical decision making point this application focuses on
- Empathize with the difficult conditions and situations their jobs put them in
- Understand and personally relate to the complexity of the drive-versus-rest decision
- Be interested in finding a better solution to the scenario's problem.

Upon completing this activity, the narrator will then "build" the Main Menu for the learner. The next section will describe how this will be done.

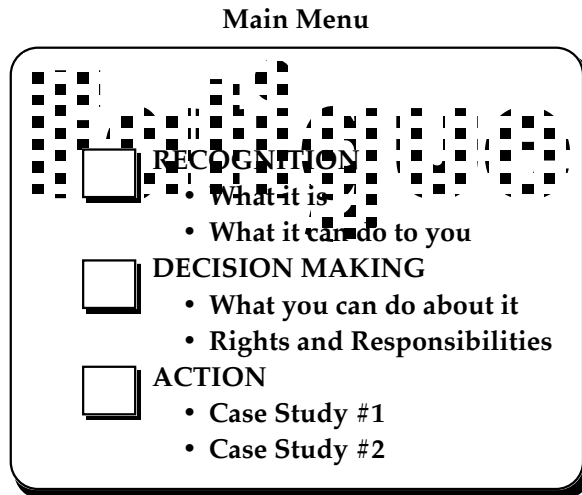
## Main Menu

Before the learner leaves the introductory activity, but after they have tried all three options, the narrator will address the fact that this can be a complex and seemingly no-win situation for the driver. But he will state that... "There is a better solution to this problem—one that will work out better for the driver, and still be acceptable to the company and client. How? That's what we're going to find out next."

The screen changes to a plain background with the word "Fatigue" embedded into it. This will be the base upon which the narrator will build the main menu. He starts by explaining that...

“This program is not just about fatigue.” (*Freeze frame images fade in and out to illustrate what he’s saying.*) “It is about how we, as professional truck drivers, decide to deal with it. This is a *Decision Making* program—designed to help us make better and more informed fatigue-related decisions.”

**Figure 1**



“It’s a three-step process...” (*Begin building menu – menu text shown below in bold.*) “...the first part is **Recognition**<sup>1</sup>. Here, we have to be able to recognize **What Fatigue Is** and **What It Can Do To You**.”

“Then, we **Make a Decision** based on two things: **What** we know **We Can Do About It**, and what our **Rights and Responsibilities** are within the company.”

“And finally, we have to be able to put the decision into **Action**—we have to be able to successfully implement it. In less time than it takes a good cup of coffee to get cold, you’ll get a chance to learn and do all of this.”

“To begin, let’s take a closer look at what fatigue is, and what it can do to you.”

The application will be designed to go through the introductory exercise and menu build only once for each learner. If a learner is unable to complete the course in one sitting, the system will remember this and bring them directly to the main menu when they sign on again. A system of lesson text highlights or check marks on the main menu will indicate which lessons have or have not been completed.

<sup>1</sup> The module and lesson titles presented here are used only to demonstrate the functional organization of the content. Their actual names will likely change during further course and script development. Lesson structuring may also change (eg. Lessons 1 & 2, “What it is” and “What it can do to you” may be combined into one section.)



## **Recognition**

The recognition section will provide the learner with most of the facts about fatigue necessary to make more informed fatigue-related decisions. This section will be fairly linear in design—to allow time for the more interactive Decision Making and Action sections.

Currently, this section is split into two lessons, “What it is” and “What it can do to you.” However, based on continued research into the content (which is still coming in from around the country) it may prove better to handle both of these lessons at the same time. In this case, the content would be broken into functional topics, such as: Sleep as a vital human physiological function; Affects of fatigue on performance, vigilance, mood, etc.; Sleep debt; Actual versus perceived fatigue; Signs & symptoms of fatigue. The “what it is” and “what it can do to you” concepts will be addressed at the same time for each topic.

This material will:

- Show drivers what factors precipitate fatigue
- Teach them how to recognize fatigue symptoms sooner
- Provide practical suggestions for better dealing with these factors and their detrimental effects.

The section would begin with a short scenario putting our society’s current need for sleep in the proper perspective. The narration may go something like this...

Modern civilization is moving in a direction our bodies were not designed for (fast-paced, 24-hour lifestyle). Our bodies are still better suited to living by the cave—driven by the sun, the moon, and the changing seasons. When the sun went down, so did we.

Sleep is now often viewed as an inconvenience... something that frequently gets in the way of our lifestyle. We stay up late to catch up on work, the newspaper, or household chores...then, we get up early to get a head start on the next day. This is why looking forward to weekends has become so deeply ingrained into our culture—its the only opportunity we have to catch up on our sleep.

During this scenario, (in either stills or video) we will be observing a typical truck driver. At one point, he will dissolve into a cave man setting...and then back into a modern, 24-hour environment. It might help to shoot this scenario around an at-home environment—to highlight the lifestyle angle of the narration.

After the scenario, the narrator will ask the learner “Let’s see how good a sleeper you are.” They will be presented with a series of true / false questions about sleep. At the end, the narrator will announce that if the

learner answered “yes” to any of the questions, they currently suffer sleep deprivation and fatigue. (Research indicates that nearly every individual in America suffers at least minor sleep deprivation on a weekly basis). These questions will be modeled on a similar set found in the AAA Foundation for Traffic Safety brochure “Wake Up!”

The narrator will then bring the learners to a menu screen with the functional topics listed on the previous page. Each topic will be accompanied by a photographic icon representing its content. For each topic, we will define the “what it is” and the “what it can do to you” issues.

After reviewing each topic (again, text highlights or check marks will label completed topics) the learner will be branched back to the main menu.

## Decision Making

The objectives for the Decision Making section are to get our learners to:

1. Make more informed sleep-versus-drive decisions
2. Understand all of the options available to them
3. Make these decisions sooner than they do now.

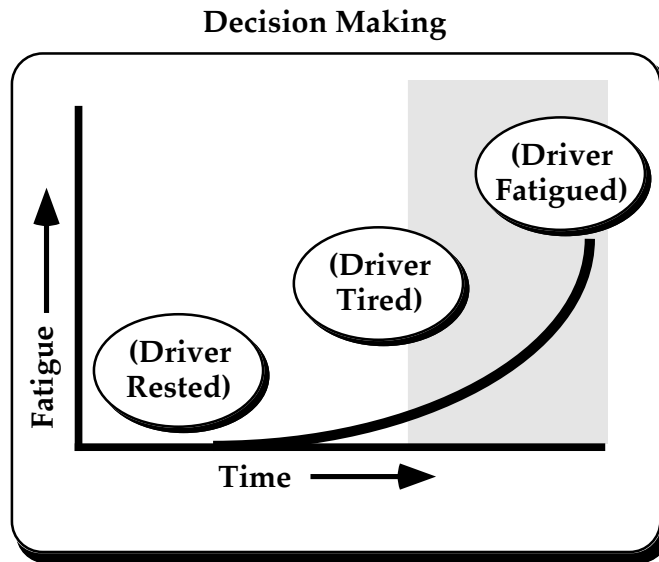
This section begins by having the narrator explain these objectives to the learner.

- She references the data about fatigue covered in the previous section, and reminds the learner of its insidious nature—that our ability to recognize it diminishes as it begins to set in.
- She foreshadows that there might be more things they can do about fatigue than they were aware of—more decisions and options they can make.
- And she points out the importance of making these decisions sooner...while there’s a better chance of a positive outcome.

The narrator goes on to explain that its more than just a sleep-versus-drive decision. There *are* other options, other actions and decisions the driver can take advantage of...however, *when* we chose to take advantage of them is critical.

As she explains this, we see a graph build on the screen with a rested driver on the left. In the middle, the driver is beginning to get tired... and at the end, on the right, the driver is obviously fatigued and a danger on the road.

Figure 3.



She highlights the area around the tired and fatigued driver pictures and points out that this is where most of us recognize our fatigue. However, this is where we are already a danger on the road...and may not even realize it.

The highlight then moves left and behind the rested driver as she suggests that this is where our most useful fatigue-related decisions can be made. She prompts the learner to begin here, and click on the rested driver to find out more.

### Rested

After selecting the rested driver, we see a short video scenario of the driver getting his next assignment—either from the cab or by phone at home. It is evident the assignment will put the driver at high risk for developing fatigue—maybe requiring overnight driving with the potential for complications.

The scenario shows a typical home / family environment and illustrates many of the demands home and family put on us. At the end of the scenario, the video freezes and the narrator asks the learner to suggest what the driver can do *now* to prevent or minimize the level of risk it brings to us. Eight or more options will be presented on the screen. The learner must choose all options they feel the driver can take advantage of [e.g. take a nap, get better organized and make a list of all of the family things we saw in the video he'll have to take care of either before or after the trip, plan the trip—locate rest stops, take along nutritious food / snacks (avoiding sugar, excessive salt, etc.), etc.].

After making their selections, the narrator will then review what the learner has correctly selected, and what they missed. Each option will be addressed individually. In this way, we will cover all of the options drivers have at this point in the fatigue-decision timeframe.

When the feedback finishes, the learner will be brought back to the graph screen. The narrator will then prompt the learner to select the middle picture—the driver getting tired.

## Tired

Entering this section, we see a video of the driver in the cab. This scenario will run for approximately 45 seconds, yet cover approximately four hours of the driver's trip. In it, we will see and appreciate how hard and tiring the driver job can be. We will also see the job begin to take its toll on the driver. He will begin to visibly show the strains of the day (or night, whichever we decide to shoot.)

Again, the video will freeze and the narrator will ask the learner what the driver can do—knowing the specifics of the assignment, time of day, conditions, etc. To vary the interactive approach, each appropriate or inappropriate option will be presented one-at-a-time. The narrator will provide answer-specific feedback for each yes or no answer.

As in the “Rested” section, all of the options drivers have at this point in the fatigue-decision timeframe will be covered.

## Fatigued

After returning to the graph screen again, the learner will be prompted to enter this section—now showing the driver still in the cab, and obviously fatigued.

We will ride along with this driver in the dark for awhile. The video will feature the monotony of the road. It will show the rig drift toward the shoulder...and the driver belatedly bringing it back. We will see the driver recognize his fatigued state and attempt to bring it under control by opening the window, taking a swig of coffee or turning up the radio.

The video freezes again...and the narrator asks what the driver should do here. A series of options are put up on the screen and the learner is asked to select all that would be appropriate.

However, this time, only one option is appropriate—getting off the road and resting. The feedback here will go into great detail to explain why this is the only safe option. The Recognition module content about fatigue will be referenced; freeze frames from the video will document his dangerous state; and research data will be presented documenting the costs from drivers who did not make this decision...and the price the rest of society has had to pay.

Once the narrator has finished going through the logic behind *why* this is the only safe decision, we will empower them with the rights and responsibilities for making or implementing it. The narrator then lays out the conditions under which SNI expects and even encourages its drivers to get off the road—for the ultimate safety of themselves, others, and the load.

Then, the narrator will lay out how the driver is expected to do this—specifying the responsibilities that go along with these rights (e.g. calling in, estimate new deliver time, identify potential negative impact on load or client, etc.)

It is in this last part of the fatigued driver section that all of the different parts of this program come together—the recognition content, the various driver decision-making options, and the implementation of the final decision. All that's left now, is to provide the learner with opportunities for practicing the recognition and decision-making process before leaving the course. This will allow us, and the learner, to see if they've truly understood and grasped the intent of the program.

## **Action**

In the Action section, our learners will get to practice what they've just learned. This section will contain at least two case studies.

The first case study will require the learner to create an acceptable solution for the opening scenario. The learner will have an opportunity to review this scenario again. Afterwards, the video will freeze and they will be asked what the driver should do next.

One concept for this activity is to engineer the scenario so that the most appropriate option is to rest—but the driver is 30 miles from the nearest safe resting area. He must do something to ensure he makes it there in one piece. Our subject matter experts and drivers will help us develop this. At any rate, our learner will have to help this driver get to a safe resting area and perform the responsibilities for calling in, estimating a revised delivery time, etc. Our goal is to put the learner through a complex decision making process that requires them to use as much of this course's content as possible.

The second, and possibly third case studies will be much simpler in design. They will present a case as a single menu screen with a series of photographic icons. These icons might include a photo of the driver, a photo of the rig and load, a map, the driver's log book, a weather report, and possibly others. By clicking on these icons, the learner will be able to collect information about the assignment, the load, road/weather conditions, the drivers condition, where the driver is currently at, a record of the previous four days in the log book, etc.

From this information, the learner should be able to make an informed decision about what this driver should or should not do to deal with his condition...and safely deliver the load. If budgets allow, it would be nice to create a library of these case studies for the different kinds of carriers—long-haul, short-haul, dedicated, etc...as well as for the many different kinds of situations drivers often find themselves in. The benefit of this library for new and inexperienced drivers would be great.

## 1.3 PRELIMINARY CONTENT OUTLINE

The following content outline was created by collecting many of the notes and quotes marked on all of the fatigue-related documents reviewed during the past month (a stack nearly five inches high.) These content pieces have been placed into the organized structure already presented in the Solution section.

### FATIGUE AWARENESS

**Overall Objectives:** (Recommendations from NTSB Report for new training program)...

Inform truck drivers of hazard of driving while fatigued:

- Need for adequate amount of sleep
- Strategies for avoiding sleep loss such as napping
- Consideration of the behavioral and physiological consequences of sleepiness
- Awareness that sleep can occur suddenly and without warning to all drivers regardless of age or experience.

### MODULE 1: RECOGNITION

#### Lesson 1: What it is

- Mismatched Evolutions—Civilization evolving faster than our bodies. Modern civilization is moving in a direction our bodies were not designed for (fast-paced, 24-hour lifestyle). Our bodies are still better suited to living by the cave—driven by the sun, the moon, and the changing seasons. When the sun went down, so did we. Sleep is now often viewed as an inconvenience...something that frequently gets in the way of our lifestyle. We stay up late to catch up on work, the newspaper, or household chores...then, we get up early to get a head start on the next day. (Answer seven “are you fatigued” questions in “Wake Up!” brochure.)
- Sleep
  - Biological need—like food
  - Detail about circadian rhythm
    - 24 hour cycle
  - Detail about biological clock
  - Non-REM & REM sleep stages

#### Lesson 2: What it can do to you

- Sleep Debt

- Data: superimpose chart of our biorhythm alertness/sleepiness with chart of number of fatigue-related collisions (“Wake Up!” brochure)
- Research = individuals tend to subjectively rate themselves as more alert than they may be physiologically. Factors that affect, mask or conceal level of sleepiness = caffeine, physical activity, and external stimuli (conversation, TV/movie, party, etc.)
  - Many truckers involved in fatigue-related accidents did not recognize that they were in need of sleep and believed they were rested when they were not. Further, ~80% rated their sleep before accident as good to excellent.
  - Indicates people have a limited ability to predict onset of sleep...and that subjects do fall asleep at times they think it is unlikely.
- Inadequate sleep, even as little as 1-2 hours less than usual, can greatly exaggerate the tendency for error during time zones of vulnerability (1-8am and 2-6pm).
- Driving at night is complicated by effects of circadian rhythms...a person deprived of sleep driving at night in the highest risk situation—a risk many drivers may not be aware of.
- Most critical factors in predicting accidents are: 1. Duration of most recent sleep period, 2. Amount of sleep in past 24 hours, 3. Split sleep patterns.
  - Driving at night with sleep deficit is far more critical in predicting accidents than simply night-time driving.
- Research = Drivers in fatigue-related accidents obtained ~5.5 hours sleep in last sleep period prior to accident (2.5 hours less than for drivers in non-fatigue related accidents).

## Module 2: DECISION MAKING

### Lesson 3: What you can do about it

- Split-sleep patterns:
  - Sleep accumulated in short time blocks is less refreshing than sleep accumulated in one long period. Also, the more sleep is disturbed or reduced, for whatever reason, the more likely an individual will inadvertently slip into sleep.
  - Research = Split-shift, sleeper berth use (driving without an 8-hour consecutive rest period) increased the risk of fatality more than two-fold. Sleep duration has been found to be as important to the recovery of performance abilities as is the quality of sleep experience.
  - Research = Sleep accumulated in short time blocks impedes the recovery of performance abilities.
  - Research = Current regulations allowing sleeper berth split sleeping can result in performance decrements earlier than for drivers who obtain sleep in longer continuous periods.

- Although the NTSB encourages the use of sleeper berths for strategic napping and recognizes that sleeper berths may sometimes allow for continuous sleep, drivers should not be encouraged or permitted to split their sleep.
- Danger signals to watch for:
  - Eyes close or go out of focus by themselves
  - Realize you keep staring at the same place
  - Trouble keeping head up
  - Can't stop yawning
  - Wandering disconnected thoughts
  - Don't remember driving the last few miles
  - Drift between lanes, tailgate, miss traffic signs
  - Must work to keep truck in lane—Keep jerking wheel to stay in lane
  - Drifted off edge of road
- Suggestions to avoid driving drowsy
  - Trip planning
  - Napping = effective countermeasure and preventive strategy. NTSB cautions that it is a supplement but not replacement for continuous 8-hour sleep. Research = napping before fatigue develops is quite effective. A single nap of about 45 minutes prior to a night without sleep can prevent significant loss of performance capability and fatigue throughout the night.
  - Recognizing split-shift patterns
  - Check for sleeping disorder—if present, get treatment

## Lesson 4: Empowerment

- Rights: Authority to stop and rest based on understanding of self and conditions
- Responsibilities: Must follow SNI procedures for implementing rest decision.

## Module 3: ACTION

- Case Study #1 (resolve opening scenario)
- Case Study #2 (graphics, video, or text...or combination)



## 1.4 DEVELOPMENT MODEL

For development of this interactive program, we will use a five phase development model.

These phases are:

- Phase 1: Research, Design and Scripting
- Phase 2: Video and Audio Production
- Phase 3: Graphics Production
- Phase 4: Programming, Video/ Audio Encoding and File Conversions
- Phase 5: Replication and Delivery.

This model will be used throughout the project for delineating phases of development, schedule development, budget development, and ultimately for establishing key milestones for the payment schedule.

The schedule on the next page outlines the tasks involved in this model, along with the timelines necessary for their completion. It may be helpful to follow this schedule as each of the model phases are reviewed.

### 1. RESEARCH, DESIGN AND SCRIPTING

#### Launch Meeting

The project development process will begin at the Launch Meeting. Here we will:

- Assign tasks and responsibilities for all team participants
- Review and approve schedules, specifications and assumptions
- Review, modify and finalize the content outline
- Begin development of interactive performance objectives and measures.

#### Content Outline

In this step, we will complete development of the content outline started at the launch meeting. This outline will include input for our subject matter experts, input from all of our resource documents, and possibly input from SNI's drivers themselves.

#### Objectives

Similar to the previous step, the interactive performance objectives will be completed and reviewed before completion of the final Design Guide.

## Design Guide

The Design Guide will become the blue print for scripting, asset development, and programming of the final application. Nearly every aspect of the finished product will be addressed in this document.

Since the cost for developing interactive applications is so high, it is imperative that this document be as accurate as possible. Any changes after this point can become very expensive.

## Script Drafts 1 and 2

We will develop three script draft levels: draft levels one and two, and a final Walkthrough script.

The first draft will lay out the basic architecture for the course and include all of the content listed in the Design Guide's content outline. This draft will be reviewed in great detail. It is at this draft review where any additional material (the ideas, insights, etc. mentioned before) will be added to or removed from the script. These changes will then be present in the second draft level for review.

## Walkthrough Script

This document represents another critical step (and development milestone). This document generates the final production script. It is called a Walkthrough script because we carefully "walk" through every part of it during a full team review.

All narration is read out loud. On projects where there are multiple narrators or actors, team members are assigned speaking parts and act out these parts during the review. And, every possible branching option is tested for logic and flow.

These reviews can be quite lengthy—some run for more than three days and have required as many as 18 people to perform successfully—but they have always saved us a great deal of time and money once the project goes into production. Why? Because, mistakes in the final script *always* prove to be costly.

## Programming Script

An interactive script is actually two scripts in one. It contains the scripted content material (including visuals and audio material) *and* programming directions. These programming directions constitute a script for the programmer—telling him what goes where, how it will function, what it will look like, what branches are available and to where, what data to collect, etc.

Much of this script is in place by the time of the Walkthrough review, however, this script cannot be finalized until all final changes have been made to the content material.

## **2. VIDEO EDITING AND AUDIO PRODUCTION**

### **Video Edit**

For successful use in interactive applications, video segments must be as “clean” as possible...for two reasons:

- The CD-i encoding process throws away 98% of the visual information in the original frames, therefore, the higher the quality of the original (the greater the amount of visual information in each frame) the better looking the encoded product will appear.
- Special video effects often used in linear videos for entering or exiting video segments (such as fade-ins, dissolves, wipes, etc.) often interfere with or prevent clean branches from section to section of an interactive application. For this reason, it will be necessary to prepare the video segments for interactive delivery and CD-i encoding.

Gary Edelburg will be responsible for production of all video and its preparation for encoding.

### **Audio Production**

Audio production will also be under Gary’s control. To keep costs low, we suggest using SNI employees for all audio and video talent.

Encoding of both the video and audio material will be handled by VuCom.

## **3. GRAPHICS PRODUCTION**

Based on design specifications in the Design Guide, VuCom will generate all graphic screens used in the application. It will be necessary for all members of the development team to review these screens: SNI-for content accuracy and look-and-feel; programming-for aspect ratios, element placement, text location and size, etc.; and VuCom’s encoders-for color intensity, hue saturation and other image issues related to successful CD-i conversion.

## **4. PROGRAMMING, VIDEO/AUDIO ENCODING AND FILE CONVERSIONS**

### **Video Encoding**

The video encoding will be coordinated by VuCom. We are currently negotiating for the best price/ quality offered, as many new providers are becoming available.

### **Audio Encoding**

The master audio tape from Gary Edelburg will be converted to a digital format, broken into individual sound files, labeled, and then

processed/compressed into the CD-i format. These files will then be synched to the visuals to create “sync scripts” for programming.

### **Graphics Conversion**

Once the graphics files are created and approved, they need to be processed, converted, and compressed into the CD-i format. As mentioned before, this will be done at VuCom. These files, along with the encoded audio and video files, will be turned over to our programmer for programming.

### **Code Development**

VuCom will manage the programming process. During this process, two versions of the application will be developed: the first will be the beta level disc used to confirm that everything looks and functions as defined in the Design Guide. The programmer will repair any bugs or perform minor tweaks that need to be done after our review of this disc.

The programmer will then cut the second version of the disc...the check disc. Again, this disc will be exhaustively tested to ensure its conformance to the design specifications.

## **5. REPLICATION AND DELIVERY**

Following the approval of the check disc, we will “burn” a final copy of the program for delivery to SNI.

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For additional information about this and other iLearn Systems projects, please call or email us at:

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