APEX 2014

Entry Title: Florida Department of Transportation Project Traffic Forecasting Training
Main Category: Electronic Media
Sub-Category: Education & Training
Entrants Information: Iskandaria Masduki, Aditya Joshi, & Lea Ann Gates
Company Name: Center for Information Management & Educational Services – Florida State University

Instructional Challenge

Project traffic forecasting is a complex undertaking and there are many factors to consider in the process of developing the forecast. The analysts often have to generate intepretations of imperfect data (some of which can border on subjectivity) and make decisions based on engineering judgment. In other words, this training teaches a complex skill that produces an outcome with various possibilities.

Instructional Solution

The instructional strategy used to develop the previously mentioned competencies focuses on developing a mental model for trainees to use when faced with different types of traffic forecasting projects – preservation, operational improvements, capacity improvement, and new alignments.

Trainees are shown how experts do their traffic forecasts with detailed explanation of the processes involved. Trainees are also provided with real-world examples of the end products consisting of multiple traffic forecasts reports submitted to the FDOT from previous projects (Figure 1).

Figure 1: Use previous projects as examples of best practices

We utilized the following 5 techniques to help novice traffic analysts learn the mental model used by experts in forecasting future traffic volumes:

1) Processes and Procedures

The training course seeks to provide trainees with the big picture in terms of processes and procedures involved in forecasting future traffic volumes (Figure 2). Additionally, trainees are often given the rationale for steps taken or decisions made within a process to enhance their understanding of relationships between people or organizations, concepts, and procedures (Figure 3).

Figure 2: Provide structure to help trainees process and apply new information
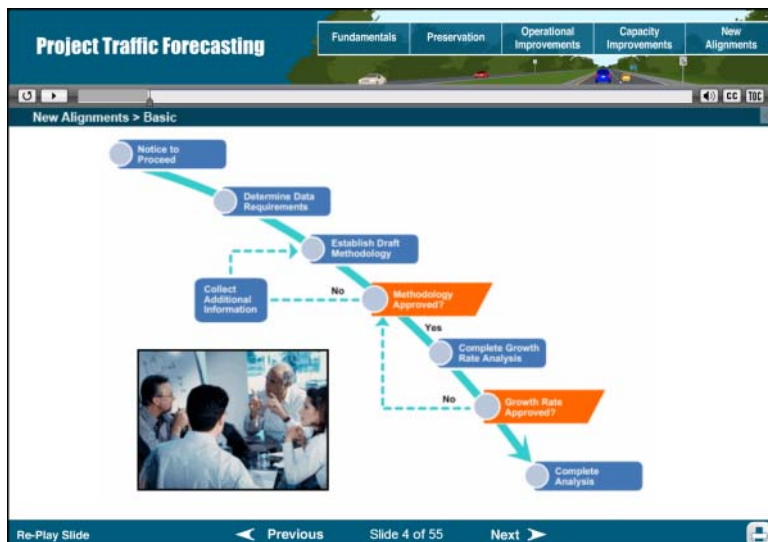

Figure 3: Provide rationale to help trainees understand relationships

2) Elaborate Practice Exercises

The provides a lot of practice for tasks common to most types of forecasting projects. These include calculating AADTs, calculating future growth rates (Figure 4), and using the TURNS5 tool. This is intended to develop skills in completing these type of tasks so that traffic analysts can then focus more on higher level thinking such as analysis and interpretation of data.
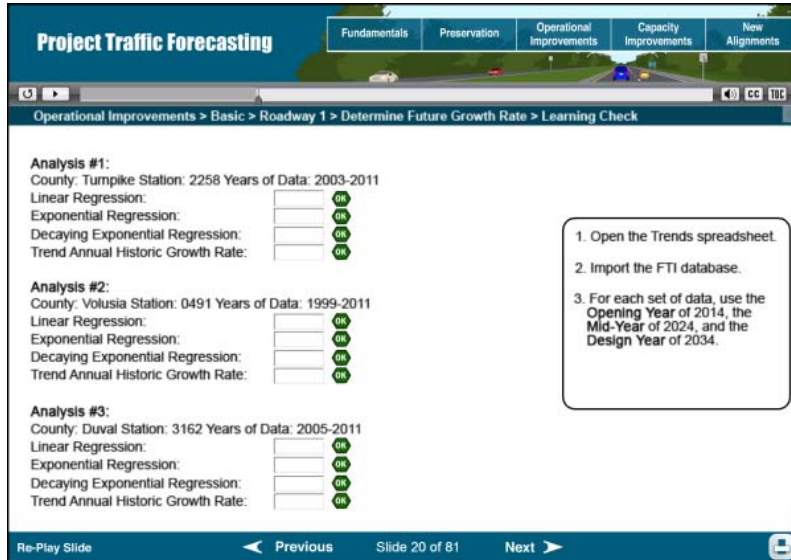
Figure 4: Practice in calculating future growth rates

The training also consists of multiple worked examples. These are step-by-step demonstrations of how to perform a task or solve a problem. In this case, each worked example is a deconstruction of a previously completed project (Figure 5). A virtual character breaks down the project into the major steps involved, guides the trainees through the steps, provides the explanations, highlights misconceptions, suggests solutions, and presents multiple practice exercises.

Figure 5: A worked example for an operational improvement project on SR 423

3) Assessment and Feedback

Developing expertise requires a deep understanding of concepts and application of that knowledge. This cannot be accomplished with simple recall of information followed by a quick feedback of "Right" or "Wrong." This training uses explanatory feedback to turn both correct or incorrect answers into additional teaching moments (Figure 9).
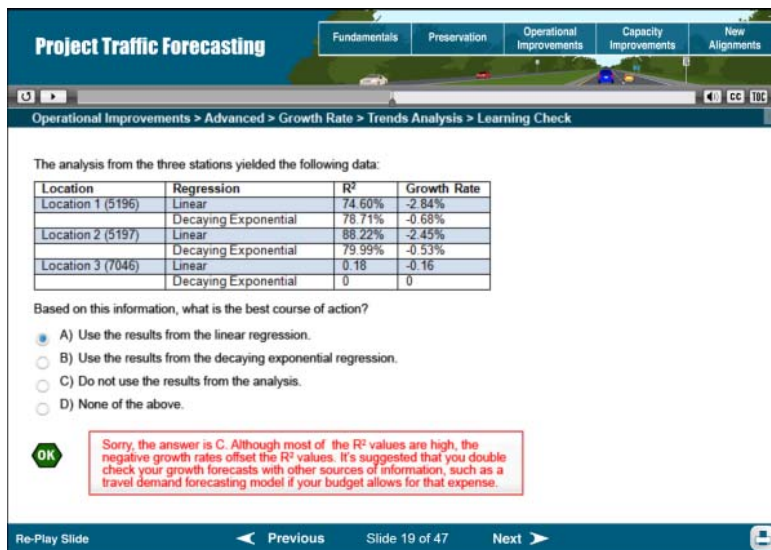
Figure 9: The training uses explanatory feedback

As trainees become more proficient and knowledgeable, the learning check questions activate higher-order thinking skills and often do not have a single correct answer. They require trainees to use judgment and apply what they have learned rather than regurgitate a common answer (Figure 10).

Figure 10: Questions activate higher-order thinking skills

4)   Engaging Graphics and Multimedia Elements

The types of graphics and multimedia elements employed includes the following:

> *Illustration or animation of concepts*
> Complex processes and concepts are explained using professional voice narration and supplemented with animations or illustrations. This multi-modal presentation of information creates a rich learning environment catering to variations in trainees' preferred learning style (Figure 11).

Figure 11: Traffic flow and bluetooth data collection process is demonstrated through animation

Software simulations

Software simulations are often used to provide an authentic software learning experience for trainees (Figure 12).
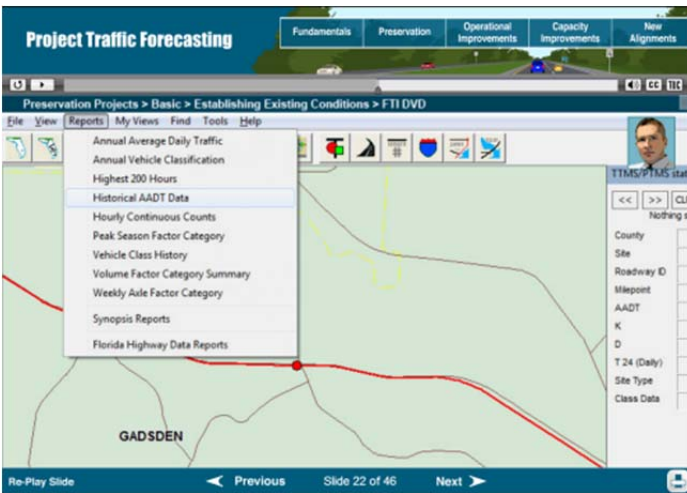

Figure 12: Software simulation of FTI DVD

Provide spatial information

Different types of graphics are used to convey spatial information considered critical to traffic analysis (Figures 13, 14, and 15).

a)   Maps

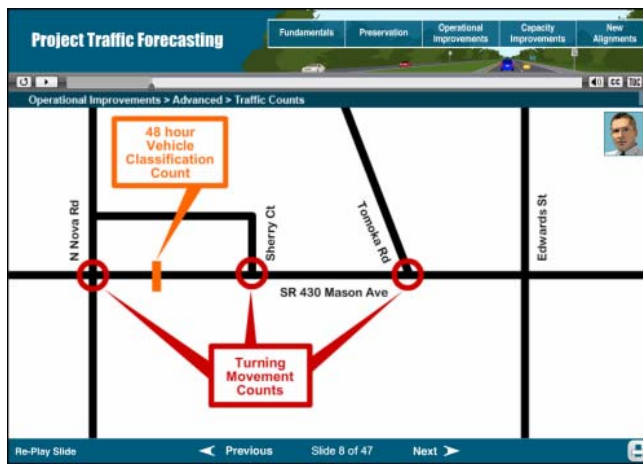Figure 13: Maps indicate location of traffic counts

Figure 15: Annotated maps provide traffic count information.

Figure 14: Annotated maps provide layers of information that guide cognitive processing

b) Site photos
Actual site photos are also used to add realism and authenticity to the training. These provide additional information an analyst may find useful when making decisions on how the collected data will be used (Figure 16).

Figure 16: Site photos show additional useful information

Organize information
The traffic forecasting process requires examination of various data sources. Tables, charts, and diagrams are used throughout the training to help organize information (Figure 17).
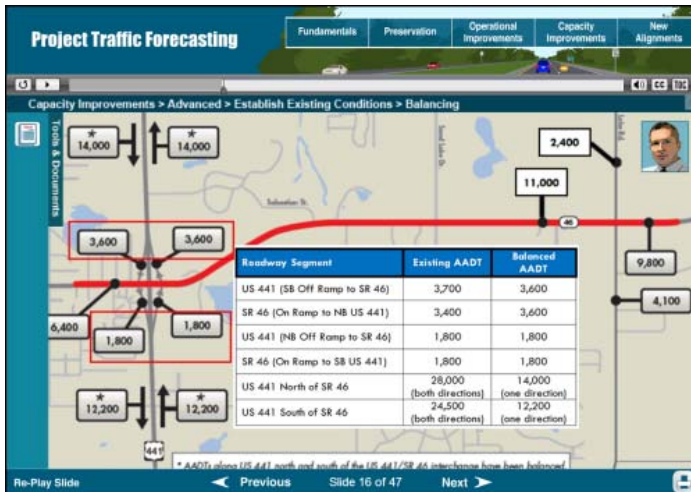

Figure 17: Graphics used to organize complex information

5)   Virtual Characters

The training course uses virtual characters to guide the learners.These characters are depicted as experts in this field to lend credibility to their roles while dispensing knowledge in a friendly and conversational way.

Personalize learning through conversational dialog
Audio narration by multiple voice actors is used to provide unique personalities to these characters. The friendly and encouraging tone are meant to engage trainees and enable them to relate to the characters and the messages they convey (Figure 18).

The training also uses the characters to provide in-depth discussions on difficult concepts or techniques. Issues or questions raised by one character becomes teaching moments through informative and lively dialog.
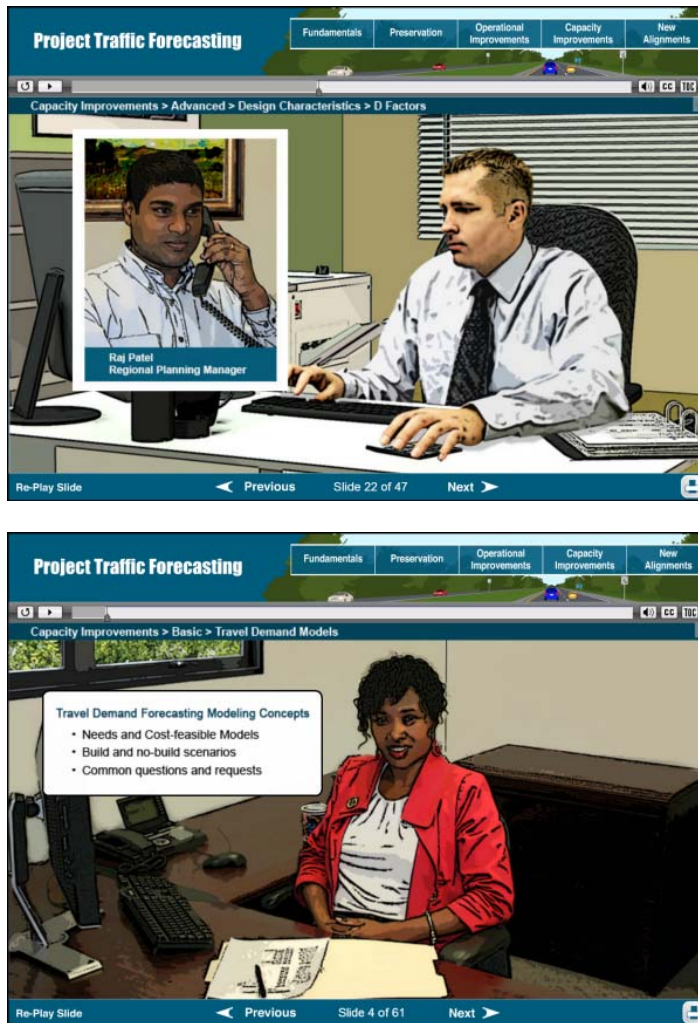

Figure 18: Narration by different voice actors lend unique personalities to the virtual characters