

TCRP

REPORT 96

TRANSIT
COOPERATIVE
RESEARCH
PROGRAM

Determining Training for New Technologies: A Decision Game and Facilitation Guide

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**Determining Training for
New Technologies:
A Decision Game and
Facilitation Guide**

BRIAN M. MOON
BIANKA B. HAHN
STERLING L. WIGGINS
STACEY L. GREEN
Klein Associates Inc.
Fairborn, OH

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Research Sponsored by the Federal Transit Administration in Cooperation with the Transit Development Corporation

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WASHINGTON, D.C.
2003
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TRANSIT COOPERATIVE RESEARCH PROGRAM

The nation's growth and the need to meet mobility, environmental, and energy objectives place demands on public transit systems. Current systems, some of which are old and in need of upgrading, must expand service area, increase service frequency, and improve efficiency to serve these demands. Research is necessary to solve operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the transit industry. The Transit Cooperative Research Program (TCRP) serves as one of the principal means by which the transit industry can develop innovative near-term solutions to meet demands placed on it.

The need for TCRP was originally identified in *TRB Special Report 213—Research for Public Transit: New Directions*, published in 1987 and based on a study sponsored by the Urban Mass Transportation Administration—now the Federal Transit Administration (FTA). A report by the American Public Transportation Association (APTA), *Transportation 2000*, also recognized the need for local, problem-solving research. TCRP, modeled after the longstanding and successful National Cooperative Highway Research Program, undertakes research and other technical activities in response to the needs of transit service providers. The scope of TCRP includes a variety of transit research fields including planning, service configuration, equipment, facilities, operations, human resources, maintenance, policy, and administrative practices.

TCRP was established under FTA sponsorship in July 1992. Proposed by the U.S. Department of Transportation, TCRP was authorized as part of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). On May 13, 1992, a memorandum agreement outlining TCRP operating procedures was executed by the three cooperating organizations: FTA, The National Academies, acting through the Transportation Research Board (TRB); and the Transit Development Corporation, Inc. (TDC), a nonprofit educational and research organization established by APTA. TDC is responsible for forming the independent governing board, designated as the TCRP Oversight and Project Selection (TOPS) Committee.

Research problem statements for TCRP are solicited periodically but may be submitted to TRB by anyone at any time. It is the responsibility of the TOPS Committee to formulate the research program by identifying the highest priority projects. As part of the evaluation, the TOPS Committee defines funding levels and expected products.

Once selected, each project is assigned to an expert panel, appointed by the Transportation Research Board. The panels prepare project statements (requests for proposals), select contractors, and provide technical guidance and counsel throughout the life of the project. The process for developing research problem statements and selecting research agencies has been used by TRB in managing cooperative research programs since 1962. As in other TRB activities, TCRP project panels serve voluntarily without compensation.

Because research cannot have the desired impact if products fail to reach the intended audience, special emphasis is placed on disseminating TCRP results to the intended end users of the research: transit agencies, service providers, and suppliers. TRB provides a series of research reports, syntheses of transit practice, and other supporting material developed by TCRP research. APTA will arrange for workshops, training aids, field visits, and other activities to ensure that results are implemented by urban and rural transit industry practitioners.

The TCRP provides a forum where transit agencies can cooperatively address common operational problems. The TCRP results support and complement other ongoing transit research and training programs.

TCRP REPORT 96

Project A-20B(2) FY'97
ISSN 1073-4872
ISBN 0-309-08772-4
Library of Congress Control Number 2003111689

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Price \$18.00

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The members of the technical advisory panel selected to monitor this project and to review this report were chosen for recognized scholarly competence and with due consideration for the balance of disciplines appropriate to the project. The opinions and conclusions expressed or implied are those of the research agency that performed the research, and while they have been accepted as appropriate by the technical panel, they are not necessarily those of the Transportation Research Board, the National Research Council, the Transit Development Corporation, or the Federal Transit Administration of the U.S. Department of Transportation.

Each report is reviewed and accepted for publication by the technical panel according to procedures established and monitored by the Transportation Research Board Executive Committee and the Governing Board of the National Research Council.

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TRANSIT COOPERATIVE RESEARCH PROGRAM

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AUTHOR ACKNOWLEDGMENTS

The decision game and facilitator guide herein were developed under TCRP Project A-20B(2) by Klein Associates Inc. Sterling L. Wiggins was the principal investigator. The other authors of this report are Brian M. Moon, Stacey L. Green, and Bianka B. Hahn.

Klein Associates wishes to acknowledge the participation of the transit industry professionals at Central Ohio Transit Authority (COTA), Metropolitan Atlanta Rapid Transit Authority (MARTA), Chicago Transit Authority (CTA), and Miami Valley Regional Transit Authority (MVRTA), who served as our subject matter

experts. Their gracious participation was essential to the success of our effort.

We also wish to thank the members of the panel for TCRP Project A-20B(2) for their encouragement and confidence and Stephan A. Parker, TCRP staff, for his outstanding support and direction throughout the course of the project.

We express our gratitude to Mike McCloskey and John Schmitt for their consultation on the development of our decision game and Dave Doughty of JDH Technologies for his assistance with Web-4M.

FOREWORD

By *Stephan A. Parker*
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The public transit industry is adopting new technologies. While some of these technologies are specific to the transit industry, many are technologies used in common with other industries—for example, voice and data-radio communications, global positioning systems, integrated management-information and productivity systems, and Internet applications. Other industries are adopting many of the same technologies as the transit industry, and forward-thinking transit managers are increasingly receptive to new technology and training and are seeking to adopt mainstream business methods and technologies. Training is essential to this transformation.

The goal of TCRP Project A-20B(2) was to help managers identify the necessary training for new technologies. As the research agency for this project, Klein Associates Inc. used cognitive task analysis to design a simulation game that would allow managers to rapidly acquire the decision skills needed for identifying the necessary training for new technologies. Training fundamentals apply to new technologies as they do to old technologies; the difference is that new technologies will fail faster and more completely without training fundamentals because of the lack of existing knowledge in the workplace.

TCRP Report 96: Determining Training for New Technologies: A Decision Game and Facilitation Guide will be of interest to managers responsible for implementing new technologies. This report will also be useful to other members of new technology procurement teams, representing operations, maintenance, human resources, legal, finance, and training departments.

Klein Associates's approach to TCRP Project A-20B(2) was to understand the cognitive demands of performing in challenging environments, which, in this case, are the difficulties that transit system managers have in making decisions about training. The research team used methods of cognitive task analysis in order to understand the decisions, the decision makers, and the context in which the decision makers must act.

Klein Associates developed an electronic decision game (eDG) to demonstrate how transit managers can experience and learn from the findings of the cognitive task analysis. An eDG is an interactive, experiential, web-based tool for training operational decision makers—both as individuals and as collaborative team members—in a realistic, stressful, simulated decision environment.

Decision games have been in widespread use in the U.S. Marine Corps for more than 10 years (where they are known as tactical decision games, or TDGs) and have spread to other fields, including aircraft maintenance, cockpit crews, general business, firefighting, and nuclear power plants. eDGs make the exercises more interactive and allow the game to be conducted for distributed organizations.

Klein Associates based its approach to TCRP Project A-20B(2) on the assumption that the most effective way to develop expert operational decision makers is to provide

several opportunities to gain operational decision-making experience under conditions of uncertainty, friction, time pressure, and stress. TCRP Project A-20B(2) was a demonstration project to illustrate the potential of this training approach; it was not a turnkey training program. The Decision Matrix Template—a product of this demonstration—was deemed by one panel member as “an excellent tool that should be used by transit agencies in prescribing the training required for new technology. It could be argued that this tool is so useful that, with some modifications, it might be used to determine whether the new technology should even be procured by the transit agency.”

The game developed in TCRP Project A-20B(2) is designed to provide simulated experience in making the key decisions regarding training during the implementation of new technologies. A Decision Matrix and a Decision Matrix Template are also provided in blank form as an aid in making training decisions.

To access (1) an electronic version of this report, (2) the decision game in Microsoft PowerPoint format, (3) the Decision Matrix, and (4) the Decision Matrix Template, select “TCRP, All Projects, A-20B(2)” from the TCRP website: <http://www4.national-academies.org/trb/crp.nsf>.

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DETERMINING TRAINING FOR NEW TECHNOLOGIES: A DECISION GAME AND FACILITATION GUIDE

SUMMARY Cognitive task analysis (CTA) interviews conducted with 14 transit industry professionals revealed seven key decisions and five important aspects of these decisions made in the transit industry about training during the implementation of any new technology. The seven decisions are as follows:

- What is the budget for training?
- Who should get training?
- What type of training will be provided?
- Who will provide training?
- What is the appropriate level of training?
- When will training be provided?
- How will training be evaluated?

The five important aspects of the above decisions are as follows:

- Goal,
- Why the decision is difficult,
- Information needs,
- Consequences, and
- Who should be, might be, and/or typically is involved?

An electronic decision game was developed to increase awareness about the above seven decisions and their five important aspects for transit industry professionals involved in the implementation of new technologies. The game can be downloaded off the TCRP Project A-20B(2) web page (<http://www4.trb.org/trb/crp.nsf/TCRP+projects>). For a more detailed description of the research approach and data collection, contact Sterling Wiggins at Klein Associates Inc., sterling@decisionmaking.com.

CHAPTER 1

INTRODUCTION

This project was based on a simple premise: Training in new technology involves more than learning what keys to press.

Transit system managers, who must recognize and meet the challenge implicit in that premise, are in the middle of operating a complex organization. This research was to help them deal with the problem of recognizing the appropriate training necessary for the implementation of new technologies.

A goal of introducing technology to a transit system often is to transform the organization. The desired transformation may be unstated or wrapped in the language of “faster, better, cheaper.” The goal may involve the establishment of a new operational paradigm. One such paradigm is moving from reactive repair to preventive maintenance. Or the goal may involve a new organizational concept. One such organizational concept is a consortium of small systems that becomes a virtual entity, and the consortium provides key functions for each of the small systems. Another goal involves making the staff more effective by sharing and using information more effectively. One example of sharing and using information is the use of global positioning system (GPS) data.

The desired transformation is often thwarted, and the new technology is underused or abandoned. The causes can be many. The Transit Cooperative Research Program (TCRP) wanted to address training as one cause. The TCRP sought research leading to an application that will support transit system managers’ choices for effective training to introduce new technology in transit systems.

THE DECISION GAME: “THE AUTOMATIC BUS ANNOUNCEMENT SYSTEM PROJECT”

This on-line game was designed to be played simultaneously by multiple players. The players can be spatially distributed. The game’s only requirements are a computer with Internet access and a telephone. The players log onto a website and join a conference call. Once all of the players have logged on, they are able to see a shared whiteboard that changes as the game advances. Players are also required to enter information and answer questions as the game progresses, and this information serves as the basis for the facilitated discussion. Total duration of the game will vary depending on the length of the discussions, but should be between 60 minutes and 90 minutes.

The game was organized around a fictional property—the Metropolis Transit Authority (MTA)—and a fictional project—the Automatic Bus Announcement System (ABAS) project. The game begins with a slide describing a “Background” of the fictional MTA, which is located in a city that has just recently been chosen to be the next site of the Olympic games and has recently seen the failure of a number of expensive technology implementations. In the subsequent “Scenario” segment, each player is assigned the role of “Advocate for Training” in the implementation of the ABAS, and the players remain in this role throughout the game. The players are presented with three separate “requirements” during the game. These requirements charge them with considering important issues related to the budget for the project, the selection of a vendor, and potential “show-stoppers” to the success of the training. Players have a limited amount of time to write their answers in the answer box that pops up on their screens. Each requirement is considered in turn during the facilitated discussion that follows the players’ responses to them. Chapter 2 presents the slides that participants see during the game.

THE FACILITATION GUIDE

The facilitation guide has two major purposes. The first purpose is to explain the components of the game with a step-by-step description of all of the processes necessary for operating the game. The second purpose is to guide an inexperienced facilitator through the task of facilitating the discussion sessions during the game. The guide has a list of possible questions for the facilitator to get the discussions started and keep the players involved and interested throughout the discussion.

THE DECISION MATRIX

In addition to the game, the research team developed an “after exercise” tool: the Decision Matrix (see Chapter 4). It represents research findings in a format that can easily be consulted by the players after the game session concludes.

The tool serves two purposes. One purpose is to remind the players of the game experience and the learning points, and the second purpose is to use the game as a reference for future planning efforts for new technologies. The Decision Matrix Template (Chapter 5) can be used by the transit professional as he or she plans for a new technology. This tool will allow the user to go through a guided process of

planning and considering the issues surrounding training for the new technology implementation early on and continuously throughout the planning process. The tool will also allow users who discover additional challenges and strategies that are not covered in the TCRP Project A-20B(2) data to record these challenges and strategies for their own reference.

CHAPTER 2**THE GAME: AUTOMATIC BUS ANNOUNCEMENT SYSTEM (ABAS) PROJECT**

The following 11 slides give the introduction and instructions for the decision game, “The Automatic Bus Announcement System Project.”



Introduction

This exercise is designed to provide you with simulated experience in making the key decisions regarding training during the implementation of new technologies.

Throughout the game, imagine that your property is being described. Others in the game will be imagining their own property, but all players will play the same role. Drawing on your own experience while interacting with other players during discussion is strongly encouraged.



MTA

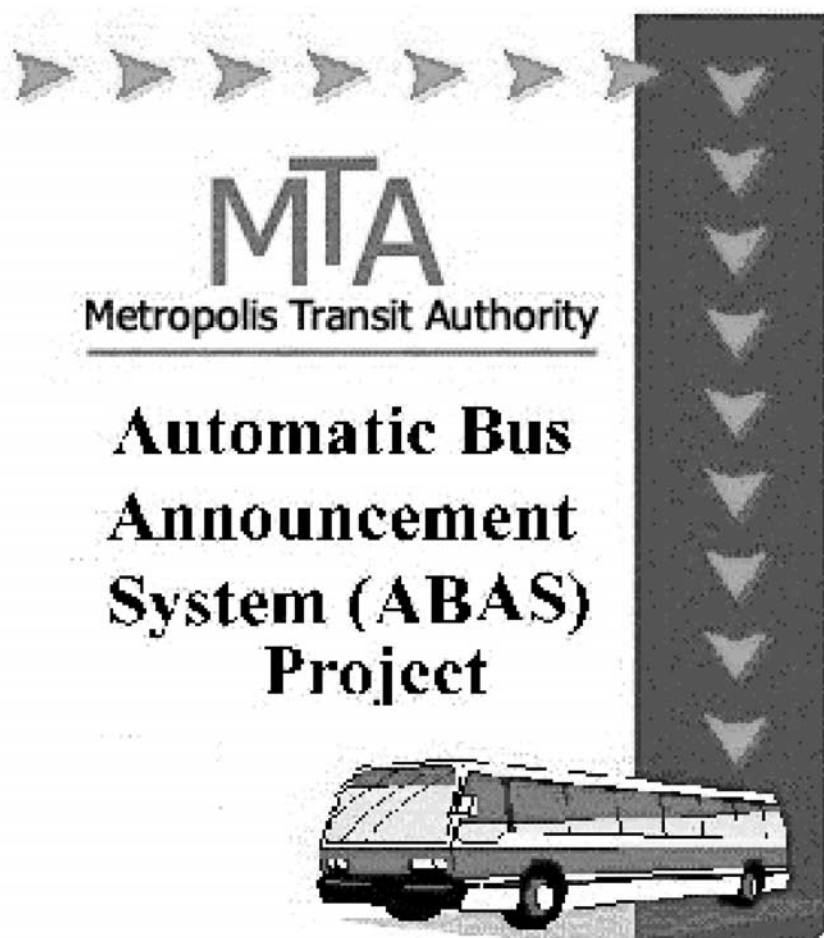
Metropolis Transit Authority

**Automatic Bus
Announcement
System (ABAS)
Project**



Background

Early last year, your city was picked as the site of the next available Summer Olympics. As part of the selection process, the city had vowed to implement a variety of upgrades to the transit authority to accommodate the expected huge increase in visitors and showcase the city's inventive culture. Meetings between the chief executive of the Metropolis Transit Authority (MTA), the mayor's office, and Olympic event planners have been widely publicized. Many of the reports have focused on the chief executive's progressive vision, but others have drawn attention to the recent failures of several expensive technologies and taxpayer outrage. The chief executive's five-year plan was released the day after the Olympics announcement. It outlined an agency-wide reorganization and goals for technology upgrades and personnel training.



Situation

You have been assigned to an MTA team tasked with implementing a new Automated Bus Announcement System (ABAS), which was recently demonstrated at a conference for transit industry managers. The ABAS provides visual and auditory automated announcements about bus destinations, route information, and passenger safety issues. The ABAS will not only enhance passengers' bus riding experience, but also keep the bus operators' attention on the task of operating the bus and thus reduce the number of accidents due to distraction.



MTA

Metropolis Transit Authority

**Automatic Bus
Announcement
System (ABAS)
Project**



Situation (cont'd)

During the first meeting of the project team you and the rest of the team are reminded about the most recent technology project that was considered to be a failure – people either are not using technology or have developed workarounds to it. Inadequate training is cited as the major contributing factor to the failure of the implementation of this last technology, and because of this you were assigned the role of advocate for training for this project. The group was also reminded that the city will be in the spotlight from now until the conclusion of the Olympics.



MTA
Metropolis Transit Authority

**Automatic Bus
Announcement
System (ABAS)
Project**

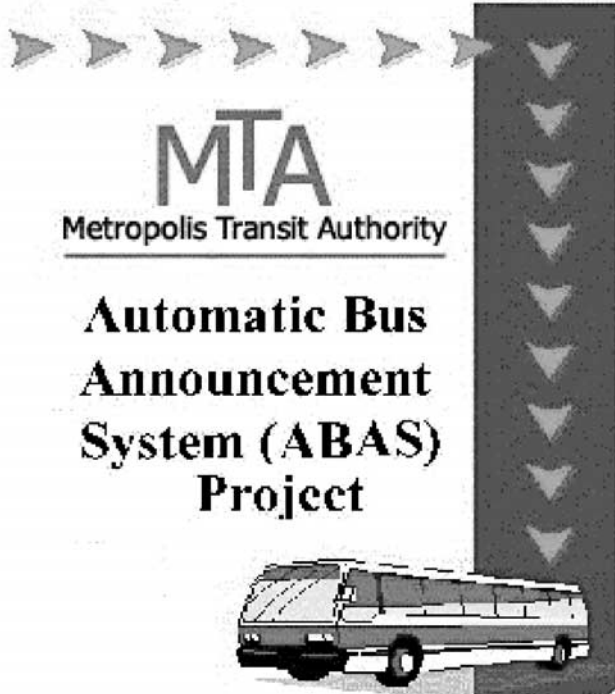


Budget Meeting

Early in the project, the group begins to think about developing a budget. It was decided that the budget planning should be chunked into pieces so that people can use their experience in estimating parts of the budget. The group decides that you, as the advocate for training, should develop a first draft of training issues that need to be considered when calculating the training budget.

Requirement

In three minutes, develop and prioritize a list of the five most important questions you will need answered in order to develop a training budget estimate. Write your list in the box that will appear. You may move the box if you need to. Type your name at the top of the text.



Vendor Selection

You are now at the point in the project where the team has created an RFP, put it out on the street, and received various proposals. The team has met several times to consider the various proposals, seen presentations from selected vendors, and made its recommendations to management. The team and management have settled on two final vendors. While the two vendors' ABAS technologies vary only a bit, each offers very different training packages. Several members of the project team focus very closely on the differences in the two technologies, but you must continue to advocate for training.

Requirement

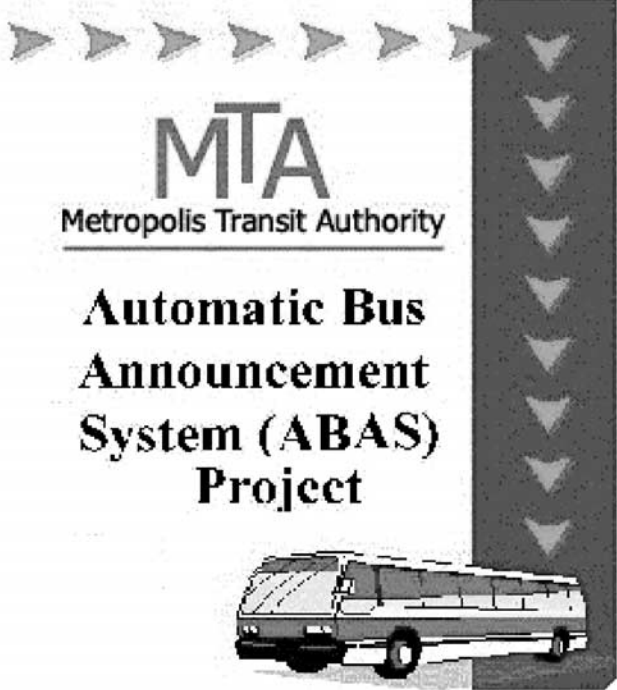
In six minutes, review the two descriptions of training services offered by the vendors, select a vendor, and prioritize the top three reasons for your choice.

Vendor A: Training package for the ABAS

- Training Approach – User Training
 - training conducted on property site
- Operator classes:
 - a two-day lecture course prior to arrival to familiarize operators with display and functionality
 - classroom materials include lecture slides and an instructional programming guide
 - a half-day refresher course upon arrival of the technology
- Maintenance classes:
 - three days of classroom lecture on general functionality of the system, history of the product, wiring diagrams, system interoperability, a troubleshooting exercise, and a video describing the manufacturing process
 - classroom materials will include lecture slides, wiring diagrams, graphics, and troubleshooting guide
 - upon arrival of technology, participants will receive a one-day hands-on refresher course with additional troubleshooting exercises at MTA
- Vendor Trainers
 - training will be led by one of the vendor's training teams, which is composed of engineers by trade with numerous years of teaching experience

Vendor B: Training for the ABAS

- Training Approach – Train the Trainer
 - training conducted at vendor manufacturing facility
- Operator trainer classes:
 - two-day lecture course on the usability of the system
 - classroom materials include all presenter slides, a guide of frequently asked questions by users, graphics to familiarize the user with display interfaces, and a handbook of programming codes for the system
 - afternoon of the last day will include exercises on an in-house simulator
- Maintenance trainer classes:
 - three-day course in lecture format that addresses general functionality of the system, history of the product, wiring diagrams, and troubleshooting exercises
 - course materials will include the presenter slides, wiring diagrams, graphics, a complete troubleshooting guide, and a handbook of frequently asked user questions
 - classroom instruction augmented by observations of the assembly line
- Vendor Trainers
 - training is led by vendor's training team, which is part of the vendor's engineering department and has been involved in the development of the technology

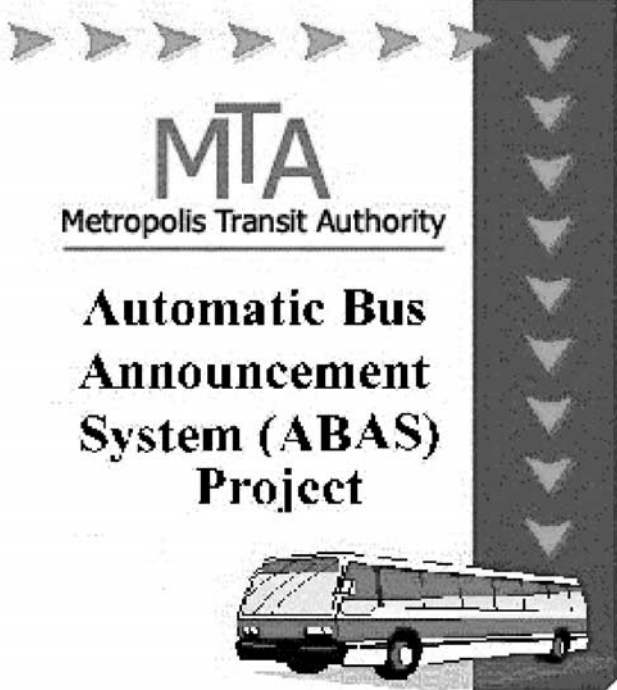


Preparing for Arrival

It is now several months prior to delivery of the ABAS. A contract has been executed with the vendor that you chose. The vendor is telling the team that the delivery timeframe looks solid. The team members are each making preparations for arrival, which includes a project timeline. You are responsible for contributing the training portion.

Requirement

In three minutes, develop a list of preparation activities for training.

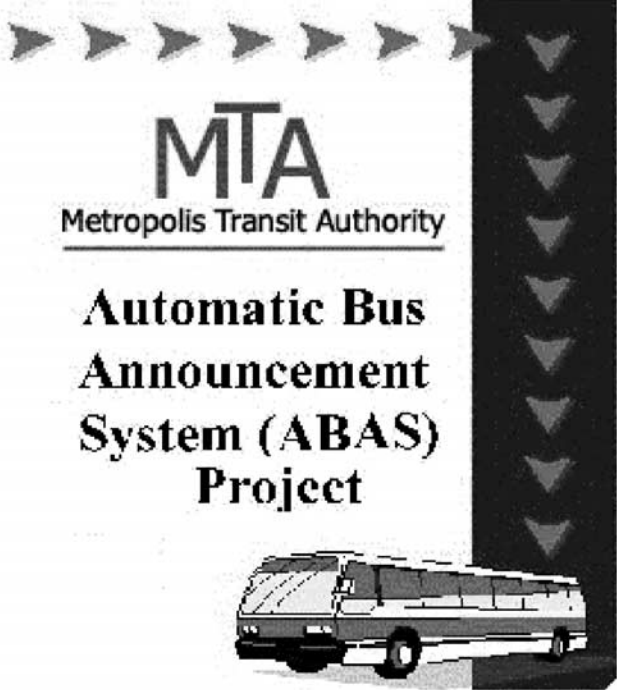


The Week before Delivery

The team is meeting for the last time prior to delivery of the ABAS. The team chose the vendor that you selected. The vendor participated in a conference call and told the team that their product and people were ready to go.

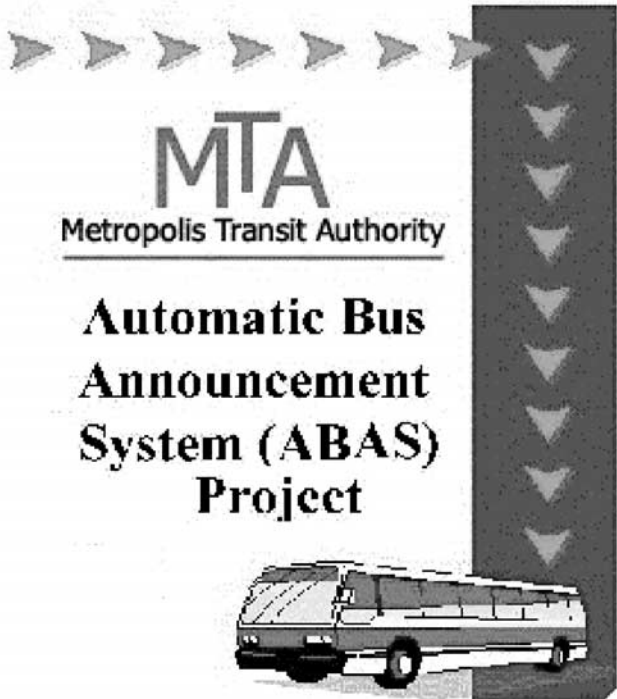
Requirement

In three minutes, create a list of training-related problems that might occur throughout the rest of the project. That is, what potential show-stoppers might alter the course of the training.



Decision Matrix

The Decision Matrix will present findings regarding six key questions about training that need to be considered throughout the implementation of new technologies. You will receive the document via email. Feel free to use it during your next implementation.



Thank you for participating

We are always looking for ways to improve our decision game. Please take a moment and enter your impressions of the game. You might consider such topics as clarity in the instructions, value of the learning experience, flow and timeliness of the facilitation, etc.

CHAPTER 3

FACILITATION GUIDE TO “THE AUTOMATIC BUS ANNOUNCEMENT SYSTEM PROJECT”

This chapter consists of two interwoven parts. One part provides the facilitator with technical instructions on how to prepare for the facilitation session by logging into the system, advancing the slides, and so forth. The second part provides guidance to the facilitator on how to assist the discussion by providing an introduction, questions to facilitate the discussions among the participants, and possible segues to the next requirement.

INTRODUCTION TO DECISION GAMES

Generally, the purpose of decision games of this type is to provide the player with the experience of thinking about the high-level decisions and the consequences of different assessments and decisions throughout an operational process. The games are domain specific and are geared toward the experience of a particular planning process and its challenges. To optimize the learning potential of these decision games, they must be facilitated effectively. A facilitator helps participants reflect deeply on their decisions. With some practice, a facilitator will also be able to draw upon the knowledge of the rest of the class, making the session highly interactive and, thus, increasing the individual’s and the group’s learning.

BRIEF DESCRIPTION OF THE GAME

The goal of this game was to provide an interactive learning experience to professionals in the transit industry engaged in making decisions about training during the implementation of new technologies. Participants were provided with opportunities to exchange knowledge across transit properties and professionals, while reflecting on their own practices within their own properties.

In any one game session, typically two to six players and one facilitator can participate. The facilitator not only presents the decision game “background,” “situation,” and “requirements” but also answers any questions regarding the game and its operation. He or she then imposes a strict time limit for coming up with responses.

The three “requirements” in this game charge the players with considering important issues related to the budget for

the project, the selection of a vendor, and potential “show-stoppers” to the success of the training. The players have a limited amount of time to write their answers in the answer box that pops up on their screens. Each requirement is considered in turn during the facilitated discussion that follows the players’ responses to them.

PART 1: PREPARING FOR THE GAME

This section provides instructions for setting up the game.

Facilitator Preparation and Logon

The Week Before the Session

Set up a conference call with all participants. This can be done either by calling the parties with a phone that allows for multiple outside lines or by calling a conference call service. All participants should be informed ahead of time what the arrangement will be and provided with the appropriate dial-up information if a conference service is used.

Participants should also be provided with the protocol for logging into the game via the Internet. Participants will need a web browser (e.g., Internet Explorer or Netscape).

The game is facilitated via a collaborative technology. The prototype for the TCRP project was delivered over “Web-4M,” which was developed by JDH Technologies.

The game consists of 11 slides to scroll through that enable participants to read text, enter text, and observe a shared whiteboard.

The slides, in order, are as follows:

1. Introduction
2. Background
3. Situation
4. Situation cont’d.
5. Budget Meeting
6. Vendor Selection
7. Vendor A and Vendor B Descriptions
8. Preparing for Arrival
9. The Week Before Delivery

10. Decision Matrix
11. Thank You for Participating

To scroll through the slides, click on each slide. Use the vertical scroll bar to reveal the hidden slides.

Minutes Before the Session

Log on and dial in to the session at least 15 minutes prior to game time. While the entire session is facilitated online, have the guide and a pen ready to jot notes in this report as the game progresses. The “Introduction” slide should be loaded and ready for participants to view as they enter the conference.

Participant Pre-Game Instructions

Once all participants have logged on and dialed in to the conference call, it is helpful to provide the participants with some instructions and guidelines as to what they should expect during the game. Welcome the participants and make sure everybody can hear each other well and see the same display on their computer screens—i.e., the “Introduction” slide (see Figure 1).

Introduction to the Game

Offer an introduction similar to this example: “*Good morning. Today we will be playing a decision-making game. It will begin by describing a background and situation of a fictional transit property. You should imagine that your own*

property is being described. Then I will present you with a series of additional scenarios, followed by a requirement for action, which will prompt you to enter information into a text box on your screen. You will have a few minutes to develop your information. We will then discuss everyone’s responses. You are highly encouraged to draw on your own experience and interact with your fellow participants. Are there any questions?”

PART 2: FACILITATING THE GAME

The following sections provide instruction in how to facilitate the game. The sections follow the course of the game.

The Background and Situation

Advance to the “Background” slide. Read the background slowly and clearly to the participants. Then move to the situation slide by clicking on the “Situation” slide link in the list of slides on the left of the screen and continue reading. Finally, read the second part of the situation by clicking on the “Situation cont’d” slide link.

After reading the entire situation to the participants, *ask if anyone has any questions that need to be clarified before you go on to the next requirement.* If participants ask questions pertaining to specific characteristics of MTA (e.g., size, organizational structure, their immediate supervisors, or union presence), refer them back to their own property’s characteristics. The goal is to get people to consider the described issues in the game as if they were facing them in their usual working context based on the characteristics on their own transit property.

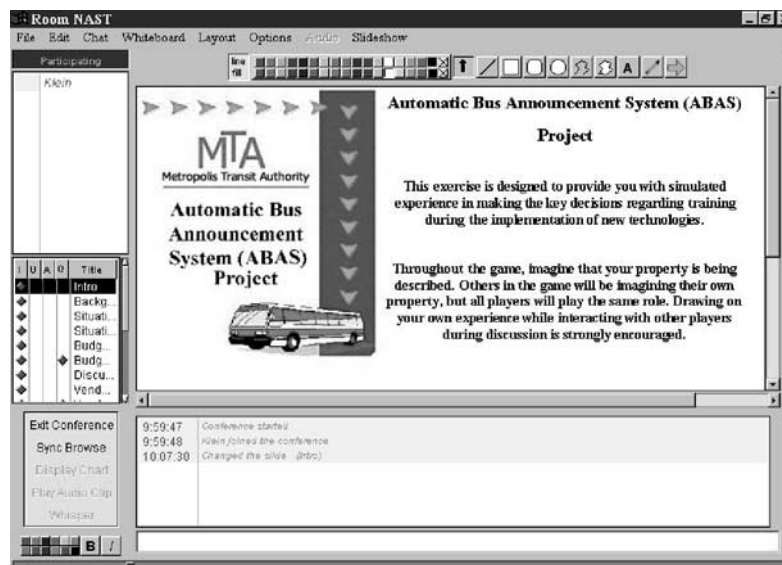


Figure 1. “Introduction” slide, as implemented in the prototype.

Possible questions that participants might ask at this point include the following:

- “Was I part of the failed technology project described in the situation description?” Answer—“No.”
- “Does the team know any specifics about why the technology implementation failed last time?” Answer—“No.”

First Requirement: The Budget Meeting

After all questions about the “Background” and “Situation” slides have been answered, advance to the “Budget Meeting” slide (see Figure 2). Read it out loud clearly to the participants. Inform the participants that a question box will pop up onto their screen in a moment and that they should enter their information into the box using their keyboards, then click on “Submit” (see Figure 3). Also inform them that they are free to drag the question box anywhere on their screen by using their mouse. Finally, ask them if they have any questions about the requirement or the question box.

Load the text box (see Figures 2 and 3), instruct the participants to start, and count down the three minutes they are allowed to respond. Make a time announcement when only one minute is remaining.

Caution: Do not advance the slideshow to the discussion slide until the time for response has run out; otherwise, the question boxes of the other participants will disappear prematurely before they have completed their answers.

Discussion

After receiving the answers of all participants and displaying them on the whiteboard, initiate a discussion by first addressing individual player’s answers and then getting the reactions of the other players. This section of the game works best if you try to keep everybody as involved as possible to keep their attention on the game. The goal is to understand what experiences people used to generate the lists and facilitate a discussion among the different players that allows them to share their experiences, which might be quite different based on their background. Everybody should have a chance to present his or her list and get reactions from others.

The list of questions below are meant to help uncover some of the assumptions, thinking processes, and experiences people bring to the game that allow them to generate their answers. Each question can be asked of any participant, but specific participants might be called upon if their participation level is low.

The discussion should take between 20 minutes and 45 minutes.

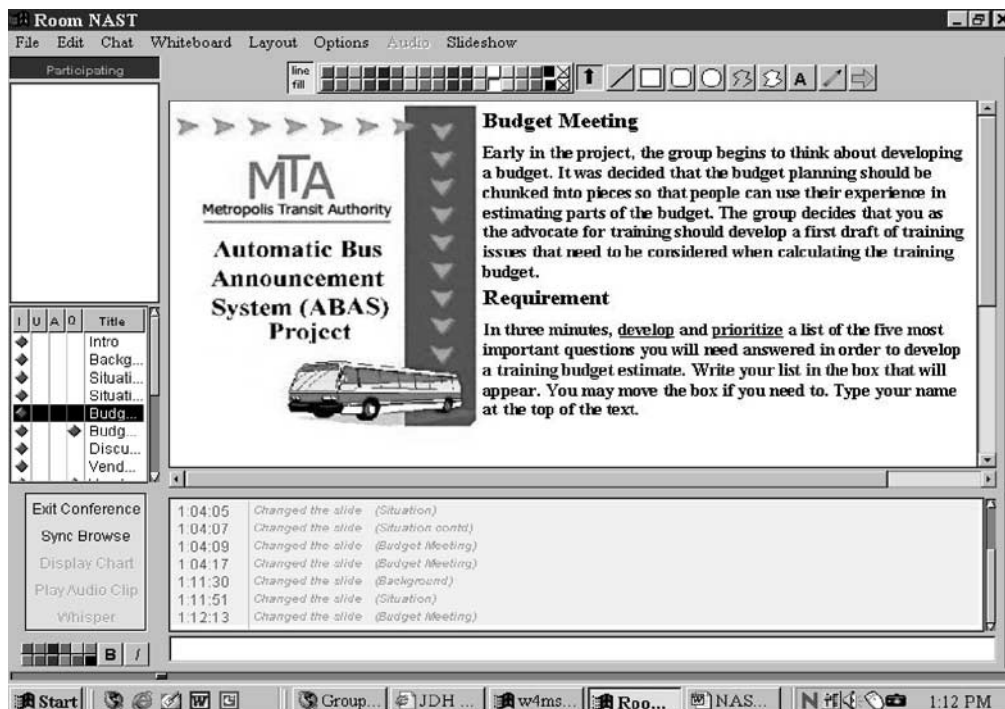


Figure 2. “Budget Meeting” slide, as implemented in the prototype.



Figure 3. Example of a question box.

Possible questions for the budget meeting. Tell the participants to take a moment to review the lists. Then discuss and clarify the lists:

- Does anyone have questions about any of the lists?
- Was it difficult to generate and prioritize the list?
- What made it difficult?
- What were you considering when generating the list?
- What strategies did you use to prioritize the list?
- How would asking X question help you make your budget? (Go through a couple of the questions.)
- What would have made it easier for you to make the list?
- What information was most helpful to you to make the list?
- Where would you get that information?
- What one piece of information that you did not have would have helped you to make that decision more easily?
- How would that information have made your decision easier to make?
- Are there any other sources that aren't usually considered but might be helpful?
- What assumptions did you make in order to come up with this list?

Explore what participants think of the other lists and how they relate to the requirement:

- What are the main differences among the lists?
- Are these differences important? Why?
- What do you agree with and why?
- What could happen to your budget if you didn't know that?

- How do these help you create a budget?
- Why is that important to know?
- Where could you get that information?

Following discussion about these questions, you might begin to summarize by using the following questions:

- Given our discussion, what questions have you thought about that haven't made it on this list yet?
- After this discussion, what feels like the highest priority? Why? Does anyone have a different priority?
- What is the one question that you have seen overlooked the most when people are budgeting?

Wrapping up the discussion and moving on to the vendor selection. When the discussion has advanced to the point of saturation of the topic, begin to wrap it up. You might segue with a comment similar to this: "This was a very good discussion, and I would like to lead us now into the second requirement if there are no further comments on this requirement."

Or, in case the discussion seems to have gotten into unrelated issues and the time is getting short, you could use a comment similar to this: "This was a very interesting discussion and I apologize for interrupting here, but in light of our limited timeframe, I would like to move on to the next requirement."

Second Requirement: Vendor Selection

Pull up the next slide, "Vendor Selection." Read the paragraph and the requirement out loud to the participants. Then

remind the participants that the question box that will appear on their screen can be moved by using their mouse. They will have six minutes to review the vendor descriptions that will appear on their screen and develop their answers. Finally, ask the participants if they have any questions about the vendor selection requirement.

Possible questions that participants might ask include the following: “*How do I know what the vendors offer?*” Answer—“There will be a slide describing the vendor profiles in a minute.”

Load the text box, instruct the participants to start, and count down six minutes. Make a time announcement when only one minute is remaining.

Caution: Do not advance the slideshow to the discussion slide until the time for response has run out; otherwise, the question boxes of the other participants will disappear prematurely before they have completed their answers.

Discussion

After the answers of all participants have been displayed on the whiteboard, the discussion can begin. Address the individual players first, then move on to getting the reactions of other players. The goal of this discussion is to understand what the individual participants found to be the most valuable information that influenced their decision. It is of value for the participants to see each other’s choice criteria and the underlying experience that led the decision process. Just like in the first discussion, it is important to involve all participants in the discussion and allow for cross-list comparisons. Below are sample questions that can be used to probe the participants for their strategies in choosing a vendor.

The discussion should take between 20 minutes and 45 minutes.

Possible questions for vendor selection include the following:

- Which vendor did you choose?
- Why?
- What was the most important factor for choosing (vendor choice)?
- What could happen if that feature were not included in the training?
- Would you switch if the other vendor were cheaper?
- How much cheaper would it need to be?
- What would make you switch to (other vendor)?
- What one question would you like to ask (vendor choice)?
- Given that you go with (vendor choice), what property resources will you have to provide?
- What didn’t you like about (vendor choice)? Or, what is your biggest concern about (vendor choice)?

- What did neither vendor offer that you would like to have?
- What is the biggest mistake people make in choosing a vendor?
- What assumptions of your own property did you make when considering the vendor choices?
- Any questions about other lists?
- As a group, I’d like you to take three minutes and try to come up with the top three reasons for selecting the vendor.

Following discussion about these questions, you might begin to summarize using these questions:

- Given our discussion, what questions have you thought about that haven’t made it on this list yet?
- What is the one question that you have seen overlooked the most when people are choosing vendors?
- Were you surprised by anything you have heard during this discussion?

Wrapping up the discussion and moving on to the vendor selection. Just as with the first requirement, when you sense that the discussion has advanced to the point of saturation of the topic, begin to wrap it up. You might segue with a comment similar to this: “*This was a very good discussion, and I would like to lead us now into the third requirement if there are no further comments on this requirement.*”

Or, in case the discussion seems to have gotten into unrelated issues and the time is getting short, you could use a comment similar to this: “*This was a very interesting discussion and I apologize for interrupting here, but in light of our limited timeframe, I would like to move on to the next requirement.*”

Third Requirement: The Week Before Delivery

Pull up the next slide, “The Week before Delivery” (see Figure 4). Read the paragraph and the requirement out loud and clearly to the participants. Then remind the participants that they can move the question box that will appear on their screens by using their mouse. They will have three minutes to develop their answers. Finally, ask the participants if they have any questions.

Possible questions that participants might ask include the following: “*Can those issues also be caused by problems with the technology?*” Answer—“Yes, if it influences training related issues.”

Load the text box, instruct the participants to start, and count down three minutes. Make a time announcement when only one minute is remaining.

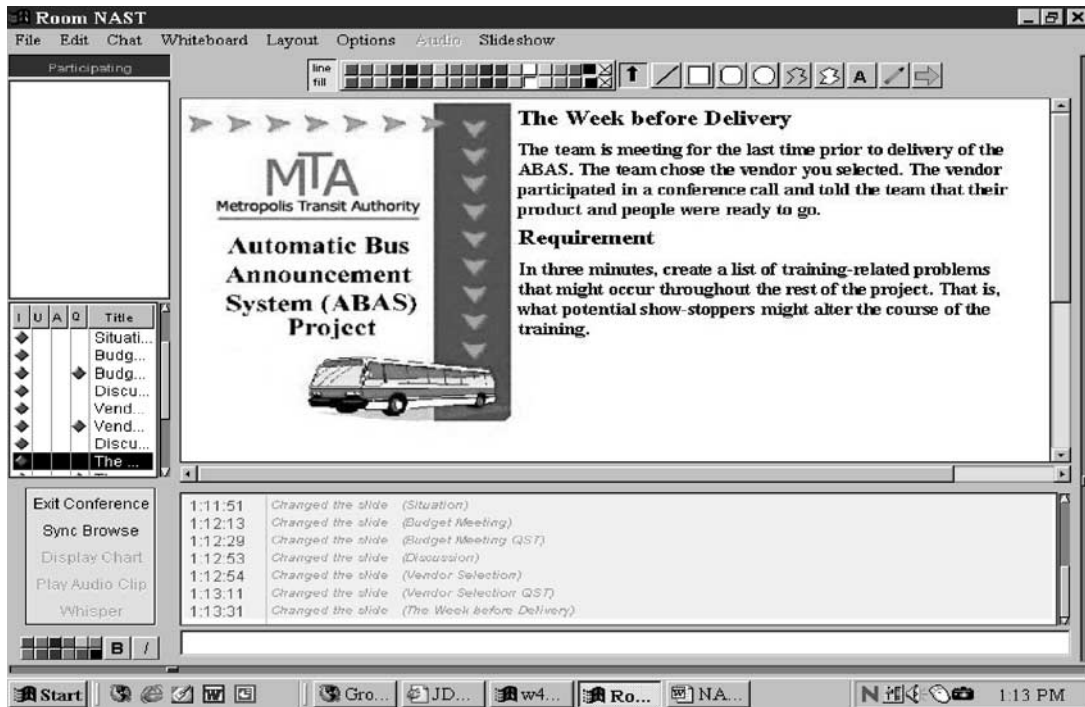


Figure 4. “The Week before Delivery” slide, as implemented in the prototype.

Caution: Do not advance the slideshow to the discussion slide until the time for response has run out; otherwise, the question boxes of the other participants will disappear before they have completed their answers.

Discussion

Once you have displayed the answers of all participants on the whiteboard, the discussion can begin. Address the individual players first, then move on to getting the reactions of other players. The goal of this discussion is to understand where the individual player sees risk areas or possible interferences with the current plan of action. Just like in the first two discussions, it is important to involve all participants in the discussion and to allow for cross-list comparisons. Below are sample questions that can be used to probe the participants for their strategies in choosing a vendor.

The discussion should take between 20 minutes and 45 minutes.

Ask one person the following:

- On your list, which one of the points would you consider the most serious show-stopper? Why?

Then ask somebody else the following:

- Do you agree with his or her choice? Why or why not?
- What did you pick as your biggest show-stopper? Why?

- Review other people’s lists; was there a point that surprised you, and why?

Then ask another person the following:

- Pick one point on somebody else’s list; what is a possible preventive measure for it?

Additional questions could be the following:

- Was it difficult to come up with the show-stoppers?
- What made it difficult?
- What were you considering when generating the list?
- What assumptions about your own property did you make when coming up with this point?
- What could you do to prevent this problem?
- What piece of information do you wish you had?
- Where would you get that information?
- Who could you involve to minimize the chances of this problem occurring?
- What would have made it easier to make the list?
- Are there any other sources that aren’t usually considered but might be helpful?
- What assumptions did you make in order to come up with this list?
- Do you have any questions about other lists?
- As a group, I’d like you to take three minutes and try to come up with the three problems most likely to occur.

Following discussion along these lines, you might begin to summarize using these questions:

- Given our discussion, have you thought of additional show-stoppers that have not made it onto our lists yet?
- After this discussion, do you feel like you could prevent any of these problems? Why or why not?
- What one problem do you believe is most often overlooked and why?

Wrapping up the Gaming Session

Your concluding statements could be similar to these: *“I would like to thank you for your participation today. We would like you to think back on the game you played today. When you think about the first, second, and third requirements, what were some of the take-away points for you? What did you learn from the game?”* Call on individuals to share their experience with the group. *“Is there anything that you have learned today that will influence how you do things in the future?”*

THE DECISION MATRIX

The Decision Matrix (see Chapter 4) is an after-exercise tool that lists the six most pressing training questions to be answered and planned for when implementing a new technology. The file for this matrix can be downloaded off the TCRP Project A-20B(2) web page at <http://www4.trb.org/trb/crp.nsf/TCRP+projects>. The first column of the matrix lists the question that a decision maker has to answer early in the planning process and the goal of answering this question. The subsequent columns list the challenges that the decision maker will face when trying to answer the question, the costs and benefits of considering this question in the planning phase of the project, possible information needs that the decision maker will encounter and should consider, and possible personnel who should be or could be involved in the decision and planning process.

The matrix serves two purposes. One purpose is to remind the players of their game experience and the learning points,

and the second purpose is as a reference for future planning efforts for new technologies. This matrix should be emailed to the players at the conclusion of the game.

The Decision Matrix Template (see Chapter 5) is a tool that can be used by the transit professional as he or she plans for a new technology. This tool will allow the user to go through a guided process of planning and considering the issues surrounding training for the new technology implementation early on and continuously throughout the planning process. The tool also allows users who discover additional challenges and strategies not covered in the TCRP Project A-20B(2) data or the experience of the game to record these challenges and strategies for their own reference. The file for this template can be downloaded off the TCRP Project A-20B(2) web page (<http://www4.trb.org/trb/crp.nsf/TCRP+projects>). The template should be emailed to the players at the conclusion of the game.

Introducing and Downloading the Decision Matrix

After the conclusion of the final requirement discussion, provide the players with a quick explanation of the Decision Matrix and its purpose while showing the Decision Matrix. Such an explanation could sound like this:

The Decision Matrix is an after-exercise tool that is meant to remind you of today’s game and its learning points as a reference for some of your future technology projects. The tool contains information about the six most pressing training questions that have to be answered when planning for new technology. The Decision Matrix Template is meant to lead you through a guided process of planning and considering the issues surrounding training for the new technology implementation early on and continuously throughout the planning process. And it allows you to note additional challenges and strategies that were not covered during the game to record them for your own reference.

Inform the participants that you will email them a copy of the Decision Matrix and Decision Matrix Template after this session is completed. Finally, thank the participants for their time and participation. The session is completed.

CHAPTER 4

THE DECISION MATRIX

The Decision Matrix, presented below, is described at the end of the previous chapter.

Question & Goal	Challenges to Achieving the Goal	Challenges to Achieving the Goal (continued)	Benefits of Achieving the Goal	Ways to Obtain Information	Personnel to Consult
<p>What is the budget for training?</p> <ul style="list-style-type: none"> - To make an accurate estimation of training costs for the final contract 	<ul style="list-style-type: none"> > Personnel in charge of budgeting do not always understand training > Training is not given a high priority > Training is the first expense that is being cut > Often only have conjecture on such decisions because technology is new and/or not transit specific, industry experience with particular technologies varies, property experience with technology is nonexistent > Often must trust vendor recommendations 	<ul style="list-style-type: none"> > Training budget is inadequate for depth, amount, or quality of training needed > Training department is upset for being excluded and is less likely to provide feedback > Multiple contracts complicate project management 	<ul style="list-style-type: none"> > Full range of necessary training can be provided to those using the technology > Problems can be foreseen in the planning phase before the contract is signed > Training department can be included in the training-planning phase to help estimate total cost 	<ul style="list-style-type: none"> > Investigate former contracts, for a similar technology can be used as a good estimate > Investigate federal procurement process > Investigate overall costs of project > Investigate vendor consultant prices 	<ul style="list-style-type: none"> > Engineers may write specs > Project manager/project team > Procurement > Department heads > Training department > Sponsor at the executive level > Consultant

Question & Goal	Challenges to Achieving the Goal	Challenges to Achieving the Goal (continued)	Benefits of Achieving the Goal	Ways to Obtain Information	Personnel to Consult
<p>What type of training will be provided?</p> <p>– To provide personnel with the most effective type of training</p>	<ul style="list-style-type: none"> > No formal evaluation criteria exist for providing conceptual training or only functional training > Some types of training promote trust and "buy into" technology better than other types > Information needs to be captured for future training of new employees > Different trainees learn better through different mediums, like hands-on training or lecture > Lack of certification in the transit industry > Level of difficulty in learning technology varies across employees > Technology often is not transit specific > Lack of guidelines regarding continuing education needs > Some technology creates more radical changes in workplace than others > Technologies differ in how they capture training information > Vendors can make changes to technologies in the implementation process that impacts training 	<ul style="list-style-type: none"> > Continuing education process not identified > Users do not feel training is worth attending or lose interest during training > Users receive training that is not tailored to user and/or departmental needs or is not transit specific > Refresher training is not identified or created > Need to repeat training 	<ul style="list-style-type: none"> > Training choice plans for future refresher or follow-on training opportunities if need be > Training addresses user needs on a level that engages user and allows for buy-in to the usefulness of new technology > Trained knowledge translates directly into application of technology and increases user's confidence in use of technology 	<ul style="list-style-type: none"> > Investigate the experience of other properties with their training choice > Investigate range of types of training available > Review results of user needs analysis > Review training materials that come with or are developed along with technology > Review vendor and/or consultant recommendations 	<ul style="list-style-type: none"> > Project manager/ project team > Training department > Vendors > Department heads > Consultant > "PC contacts"

Question & Goal	Challenges to Achieving the Goal	Challenges to Achieving the Goal (continued)	Benefits of Achieving the Goal	Ways to Obtain Information	Personnel to Consult
<p>When will training be provided? – To provide training in a timely enough manner.</p>	<ul style="list-style-type: none"> > Training usually happens after purchase > Lack of guidelines regarding when and how to alert training department about the date the technology will arrive > Date of technology arrival is subject to change > Long-term training goals for users run counter to short-term functions of users > Vendor training materials must be reviewed and adapted prior to the training date > Attendance is typically not mandatory > Training materials must be gathered and checked for quality > Trainers must be allotted sufficient time to train on the technology and prepare lessons and materials > Continuing education is not standardized > Technology often must be tested prior to training > Training time is reduced as deadlines approach > Training time available varies for each department > Training space may be limited 	<ul style="list-style-type: none"> > If training is not done in time, it "hurts" the training department and its evaluation > Training too early creates loss of information and does not allow for hands-on training > Creating too many new training programs without reducing old ones > Training too late results in users being introduced to, and sometimes using, the technology without understanding its purpose and functions > Trainers have too little time to prepare > Trainers miss opportunities to see technologies at manufacturers or train at vendor > Training offered during periods of high demands on users results in decreased attendance > Technology becomes outmoded prior to use 	<ul style="list-style-type: none"> > Training ends as technology is implemented; immediate application of user's new knowledge > Training provides conceptual as well as functional understanding of technology > Trainers can evaluate user needs and tailor class material accordingly > Trainers have time to see technology being manufactured and can better tailor training to user needs > Scheduling of training to avoid time conflict and training overload; increase training impact on user 	<ul style="list-style-type: none"> > Investigate arrival date of technology > Investigate curriculum > Investigate duration of training > Investigate training department's availability > Investigate technology testing period > Investigate internal and external deadlines and/or cycles > Investigate training space > Investigate vendor and/or consultant recommendation 	<ul style="list-style-type: none"> > Project manager/ project team > Training department > Vendor > Department heads > Consultant

Question & Goal	Challenges to Achieving the Goal	Challenges to Achieving the Goal (continued)	Benefits of Achieving the Goal	Ways to Obtain Information	Personnel to Consult
<p>What is the appropriate level of training?</p> <p>– To provide personnel with sufficient information about and familiarity with the new technology</p>	<ul style="list-style-type: none"> > Different users require different levels of training > Different departments require different levels of training > New technology can supplement or replace current technology > New technology may or may not include some components of current technology > Users are reluctant to train in new technology due to lack of confidence, inexperience, entrenchment in ways > Materials need to incorporate users' current knowledge and convey the appropriate level of new information > Warranty might affect training > Vendor technology might employ subcomponents not of vendor's making > Some technologies require prerequisite training > Some users are hesitant to be trained with subordinates 	<ul style="list-style-type: none"> > User interest level is low because training is too easy, too hard, too foreign, or user is overwhelmed > Implementation is extended to provide additional or repeat training > Users feel and express a lot of negative emotion when using technology > Users unable to learn advanced application 	<ul style="list-style-type: none"> > Users understand the value added by new technology and how it applies to their job > Users have sufficient knowledge of technology to do their job at "go live" date > Users "buy into" technology > Users try to make most out of training (attention/attendance) 	<ul style="list-style-type: none"> > Collect and consult results of user needs analysis > Investigate user knowledge and skill levels > Foster thorough understanding of technology > Foster thorough understanding of differences between old and new technology > Investigate types of training materials 	<ul style="list-style-type: none"> > Training department > Project manager/project team > Vendor > Department heads > Consultant > PC contacts

Question & Goal	Challenges to Achieving the Goal	Challenges to Achieving the Goal (continued)	Benefits of Achieving the Goal	Ways to Obtain Information	Personnel to Consult
<p>Who should get training? To identify personnel interfacing, using, repairing, maintaining, and training users of the new technology</p>	<ul style="list-style-type: none"> > Scheduling training often causes time conflicts > Users are needed in jobs or other training > Trainees' needs are not well understood > Trainees are resistant to change and do not want to learn new technology > High turnover rate in some departments > Users get training then leave agency > Training is not mandatory and therefore not taken advantage of > Training is offered to staff at time of implementation but not considered for future incoming staff > No formal process exists to identify department trainers 	<ul style="list-style-type: none"> > Departments/users who need the training do not get trained, creating interfacing problems and underuse of technology > If current employees are not trained well, then future new employees will not receive good training on use of the technology > Need to rely on outside source (like vendor) to provide training that is most likely not specific to transit industry or department 	<ul style="list-style-type: none"> > Well-trained personnel are more likely to use new technology to its full extent > Building in-house expertise on use of technology will reduce dependence on outside training or services in the future and therefore reduce future costs 	<ul style="list-style-type: none"> > Know the trainees' knowledge and skill levels > Investigate availability of the trainees > Analyze how much working knowledge of technology is needed by trainees > Investigate the necessary level of involvement for users in development/design of technology/application 	<ul style="list-style-type: none"> > Department heads > Project manager/project team > Users > Vendor > Consultant

Question & Goal	Challenges to Achieving the Goal	Challenges to Achieving the Goal (continued)	Benefits of Achieving the Goal	Ways to Obtain Information	Personnel to Consult
<p>Who will provide training?</p> <ul style="list-style-type: none"> - To provide personnel with the most effective trainers 	<ul style="list-style-type: none"> > Effort level and time the training department needs to familiarize itself with the technology and to prepare training, materials, and its trainers > Some trainers promote trust and "buy into" technology better than others > No formal policy declaring which department is responsible for training > Level of difficulty in learning technology varies > Quality of vendor trainers varies; vendor might use outsourced trainers; vendor might use own professional trainers or own designers/developers > Abilities, willingness, and availability of department staff to provide training varies across departments > Technology might include subcomponents with which vendor is not familiar > Departments are "sensitive" about training their own systems > Level of involvement of department in technology/application design varies > Property, vendor, consultant have turnover > Vendors vary on levels of independence/objectivity, concern about cultural change > Vendors can change technologies 	<ul style="list-style-type: none"> > Users do not feel training is worth attending or lose interest during training > Too heavy a reliance on vendor or ill-equipped property staff > Refresher trainers are not identified > Need to repeat training 	<ul style="list-style-type: none"> > Trainer is familiar with users' knowledge needs to successfully use technology 	<ul style="list-style-type: none"> > Inquire vendor capabilities, quality assurance > Investigate range of types of trainers available > Investigate training department capabilities and workload > Assess abilities, willingness, and availability of department staff to provide training > Take the style and personality of trainers into consideration > Inquire about vendor and/or consultant recommendation from other properties 	<ul style="list-style-type: none"> > Training department > Vendor > Project manager/project team > Department heads > Consultant

Question & Goal	Challenges to Achieving the Goal	Challenges to Achieving the Goal (continued)	Benefits of Achieving the Goal	Ways to Obtain Information	Personnel to Consult
<p>How will training be evaluated?</p> <ul style="list-style-type: none"> - To determine whether training was sufficient and effective 	<ul style="list-style-type: none"> > Budgets do not include evaluation funding > Many interwoven factors contribute to training success, some of which are inherent in workforce and political workings of properties > Training department does not have formal evaluation criteria > Lack of explicit expectations of performance of new technology 	<ul style="list-style-type: none"> > Needed follow-on training is not provided > Future staff training is of poor quality > Training cited as the primary reason for failure of technology > Vendors provide poor-quality training to other properties and/or on other projects 	<ul style="list-style-type: none"> > Identify shortcomings of training, and arrange for individual or group follow-up training > Early detection of training shortcomings of current staff, chance to arrange for refresher training > Identify training type/style/outcome successes > Knowledge about vendor training quality for future project planning 	<ul style="list-style-type: none"> > Early on, decide on expectation of performance with new technology > Collect base lines of user performance prior to training > Investigate formal performance evaluation criteria 	<ul style="list-style-type: none"> > Training department > Users > Project manager/project team > Vendor > Department heads > Sponsor at the executive level > PC contacts

CHAPTER 5

THE DECISION MATRIX TEMPLATE

The Decision Matrix Template, presented below, is described in the final section of Chapter 3.

Question & Goal	Challenges to Achieving the Goal	Strategies for Achieving the Goal	Costs and Benefits of Achieving the Goal	Ways to Obtain Information	Personnel to Consult
Who should get training? – To identify personnel interfacing, using, repairing, maintaining, and training the new technology					
What type of training will be provided? – To provide personnel with the most effective type of training					
Who will provide training? – To provide personnel with the most effective trainers					
When will training be provided? – To provide training in a timely enough manner					
What is the appropriate level of training? – To provide personnel with sufficient information about and familiarity with the new technology					
How will training be evaluated? – To determine whether training was sufficient and effective					

Abbreviations used without definitions in TRB publications:

AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
IEEE	Institute of Electrical and Electronics Engineers
ITE	Institute of Transportation Engineers
NCHRP	National Cooperative Highway Research Program
NCTRP	National Cooperative Transit Research and Development Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
SAE	Society of Automotive Engineers
TCRP	Transit Cooperative Research Program
TRB	Transportation Research Board
U.S.DOT	United States Department of Transportation