2006-12-08

Banking Transactions and Controls Training for Deutsche Bank Operations Employees

Jodi Young
Brigham Young University - Provo

Follow this and additional works at: https://scholarsarchive.byu.edu/etd

Part of the Educational Psychology Commons

BANKING TRANSACTIONS AND CONTROLS TRAINING FOR DEUTSCHE

BANK OPERATIONS EMPLOYEES

by

Jodi Young

A master's project submitted to the faculty of Brigham Young University in partial

fulfillment of the requirements for the degree of

Master of Science

Department of Instructional Psychology and Technology

Brigham Young University

November 2006

BRIGHAM YOUNG UNIVERSITY

GRADUATE COMMITTEE APPROVAL

of a project submitted by

Jodi Young

This project has been read by each member of the following graduate committee and by majority vote has been found to be satisfactory.

_____   _____
Date   J. Olin Campbell, Chair

_____   _____
Date   Andrew S. Gibbons

_____   _____
Date   Charles R. Graham

BRIGHAM YOUNG UNIVERSITY

As chair of the candidate's graduate committee, I have read the selected project of Jodi Young in its final form and have found that (1) its format, citations, and bibliographical style are consistent and acceptable to fulfill university and department style requirements; (2) its illustrative materials including figures, tables, and charts are in place; and (3) the final manuscript is satisfactory to the graduate committee and is ready for submission to the university library.

_____   _____
Date   J. Olin Campbell
                                                                       Chair, Graduate Committee

Accepted for the Department

                                                                 _____
                                                                       Andrew S. Gibbons
                                                                       Department Chair

Accepted for the College

                                                                 _____
                                                                       K. Richard Young
                                                                       Dean, David O. McKay School of Education

ABSTRACT

BANKING TRANSACTIONS AND CONTROLS TRAINING FOR DEUTSCHE

BANK OPERATIONS EMPLOYEES

Jodi Young

Department of Instructional Psychology and Technology

Master of Science

This report describes the development process of the *Deutsche Bank Intro to Controls* instructional training tool. This course utilizes a multi-faceted, blended approach, including web-based training, simulation, and instructor-led training components to teach complex banking operations. The report includes a literature review describing instructional theories, and strategies concerning the use of a blended approach in the training of complex systems and operations. The report also includes a description of the formative evaluation process and results. These results demonstrated a positive response to the content and instructional strategies employed in the training, as well as the need for future research to evaluate long-term effects of the training. Finally, the report contains a critique of the project, discussing its strengths, its weaknesses, and opportunities for future training projects.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Introduction

Purpose of the Project

Business organizations and corporations use complex operations and processes to carry out their daily transactions. Each employee within the organization takes a small part in the functioning of the entire process. To an employee working in an isolated environment, it may be difficult to grasp the workings of the entire process. However, if employees could understand the entire complex operation of which they take part, their understanding of the tasks they perform would improve, and the overall flow of the entire process would be increased. The purpose of this project is to facilitate the learning of complex operations through a multi-faceted, blended instructional approach, including the use of instructor-led training, web-based training, and simulation. This comprehensive approach provides learners with social interaction, solid instruction, and a simulated environment, which allows them to observe and manipulate the entire operations process.

Banking corporations engage in large numbers of complex transactions and processes each day. Deutsche Bank is a global leader in corporate banking, transaction banking, and private wealth management. With approximately 972 billion Euro in assets and over 63,000 employees worldwide, having well-trained, professional employees, instructed in operations processes and the importance of control implementation, is paramount in smooth transaction processing, loss prevention, and asset protection.

Banking transactions incorporate a series of acts involving many people performing various actions to meet a specific objective. A transaction is any event that causes a change in the organization's financial position, resulting from normal business

activities. Transactions involve commercial activities, communications, and movements carried out between separate entities or groups. Examples of banking transactions include the transfer of funds from one establishment or individual to another and the buying and selling of securities.

Within a financial institution, transaction tasks are divided among several different departments. Deutsche Bank utilizes three departments or offices to carry out transaction operations: the front office, middle office, and back office. The segregation of tasks across different groups prevents any one individual or group from gaining too much access to securities. For example, in a bond purchase transaction, the front office trader executes a trade, the middle office enters the trade into the system, and the back office settles the trade. This segregation of tasks prevents the trader from making a trade and settling the trade within his or her own account.

In an ideal world, the transaction process would occur smoothly. However, in the real world, data is mistyped, errors are overlooked, and occasionally dishonest individuals find ways to engage in fraudulent activity. Consequences of such activities include trade failures, financial loss, and a reputation impact for the financial institution. To prevent errors and costs, banks can implement controls within the transaction process. Controls are optional measures used to prevent or detect failures and losses. Examples of controls within banking operations include verification, reconciliation of different data sources, and double checking of another employee's work.

Controls ensure accuracy, but they also come at a cost. A challenge for financial institutions is to discover when the benefits controls provide outweigh the costs they incur. The purpose of this training is for employees to see their part within the bigger

transaction process and to realize the importance of their role in preventing error and loss. This training also helps employees examine the impact of controls on the transaction processes in which they take part to evaluate control benefits versus their subsequent costs.

In partnership with Deutsche Bank and Allen Communication Learning Services, I designed an introduction to controls and transactions training course for Deutsche Bank operations employees. This training instructs employees in funds transfer and bond purchase processes, as well as the implementation of controls within the transaction process, to prevent surplus loss and error. By the end of the training, learners should understand the overall trade process and be able to apply proper controls within their prospective employment areas.

Target Audience Analysis

The target audience for this training consists of new employees (from six months' to two years' experience) who have little knowledge of controls or transaction processes. Based on the descriptions provided from the Deutsche Bank team and the data received from a learner questionnaire, the target audience can be characterized by the following:

1. Demographics: Deutsche Bank employees and Smartsourced vendors comprise a large and diverse population with different educational, ethnic, cultural and professional backgrounds. They work in fast-paced, large-volume financial centers throughout the world.

2. Geographical location: Deutsche Bank is an international financial institution. Therefore, this course may be presented in many geographical locations, including: the United States, Europe, India, and the Philippines.

3. Language: While this training may occur in various geographical locations, there is an assumption that all Deutsche Bank employees have an understanding of the English language. Also, it is assumed that Deutsche Bank employees are generally well-educated. The language of this course is not complex, in order to increase attention and ensure that learning occurs.

4. Job description: The audience includes Deutsche Bank employees who work in middle office operations and back office operations, as well as Smartsourced resources. This audience has various levels of experience with investment banking operations. The majority of those surveyed had up to two years experience with investment banking. Forty-eight percent of the survey respondents had one year or less experience in investment banking.

5. Education: Learners have a high school diploma or equivalent or higher.

6. Computer experience: All learners are computer literate, although they may have varied experience with web-based training, from novice to advanced experience.

7. Control experience: While most learners surveyed reported they were aware of the use of controls in their department, most learners stated they had received little or no control training. Learners also reported they thought a knowledge of controls would be "very important" in their position to help them prevent errors and reduce risk. As a result of the outcomes of the learner surveys, it is assumed that the users of the *Deutsche Bank Intro to Controls* course have little or no knowledge of controls.

8. Transaction training: According to the learner questionnaire, learners reported little or no training in the bond purchase lifecycle and money transfers.

9. Personal training preferences: Within the learner questionnaire, the majority of learners reported a preference for an interactive learning experience that employed various instructional strategies and enforced the relevance of the information to the employee's profession.

Deutsche Bank employees strive to increase their performance and work together to achieve success. The *Deutsche Bank Intro to Controls* course attempts to address the diverse Deutsche Bank audience in a way that is engaging, motivational, and directly related to success on the job. Each learning activity is carefully constructed to keep in mind the needs of the audience.

Literature Review

Methodology

Banking operations employees face complex issues and decisions. Consequently, there is a need for training models that can transmit the knowledge and skills needed to perform in a complex environment and improve processes through the implementation of controls. Although individual employees may only work in a small portion of the operations process, an understanding of the entire operations process will enable the employee to be better prepared to confront the different decision-making situations faced in everyday work activities, and to predict the outcome of these decisions.

To understand a process, learners must be able to witness it and, more importantly, interact with this process. According to constructivist theory, "knowledge is constructed by learners as they attempt to make sense of their experiences" (Driscoll, 2000, p. 376). Learners are not viewed as empty vessels waiting to be filled, but rather active organisms seeking meaning. The constructivist view asserts that learners construct

knowledge by making sense of experiences in terms of what is already known (Lainema & Makkonen, 2003). According to Kirkley and Kirkley (2005), cognitive conflict or puzzlement is the stimulus for learning. From military to avionic training, simulations have been used as a way to allow learners to construct knowledge in a realistic manner that is safer and more cost-effective than learning in the actual environment (Towne, 1995).

Computer simulations provide the opportunity to simulate reality within a microworld artificial environment. Traditionally, computer simulations attempt to solve problems and to predict behavior based upon a set of parameters or initial conditions (Thavikulwat, 2004). Within simulations, learners are faced with opportunities to make decisions based on prior knowledge of processes. These decision-making opportunities force students to decipher relations between variables and predict outcomes in a safe environment. Savery and Duffy (1996) identified seven constructivist principles or instructional design guidelines:

1. Anchor all learning activities to a larger problem.

2. Design an authentic task.

3. Design the learning environment to reflect the complexity of the environment in which the learner should be able to function at the end of learning.

4. Support the learner in developing ownership for the overall problem.

5. Design the learning environment to support and challenge the learner's thinking.

6. Encourage testing ideas against alternative views and alternative contexts.

7. Provide opportunity for and support reflection on both the content learned and

the learning process.

To the extent that these seven principles are applied when creating a computer training simulation, learners may develop complex problem-solving and decision-making skills.

Studies have shown several advantages in using computer simulations for training purposes. According to Zenger and Uehlein (2001), benefits to using computer simulations in a training environment may include:

1. The built-in extraordinary realism

2. The highly interactive nature of the experience

3. The opportunity for learners to make safe mistakes and get immediate feedback

4. The capability of learners to achieve unconscious competence by repeated practice.

Computer simulations provide an authentic, safe environment in which the learner can control and manipulate distinct variables to see how specific actions can impact outcomes and results (Kirkley & Kirkley, 2005). Complex systems may be difficult to observe or even subject to failure or dangerous outcomes when used incorrectly. Carefully implemented simulations present the same system in an environment conducive to study, observation, and manipulation (Towne, 1995). This ability to observe and manipulate variables can reveal previously hidden insufficiencies and uncover unknown relationships between findings (Lewandowsky, 1993). Thus, while employees manipulate variables within the simulation, they can discover weaknesses within processes, identify methods to improve, and predict previously unseen outcomes of decisions.

Although researchers agree on the benefits of using simulations as an alternative to real world experience, researchers' opinions differ on the challenges in using computer simulations in training situations. Lewandowsky (1993) argued that it may not be possible for a simulation to be a perfect substitute for the real experience, and that counterintuitive results and discrepancies may occur during implementation and experience with the real situation, such as a military training simulation and a real-world military situation. However, Towne, de Jong, and Spada (1993), and Kirkley and Kirkley (2005) argue that while transference of knowledge from the simulation to the real world may have some negative implications, the greater challenge lies in the learning abilities and disabilities of the learner. Complex systems, such as business processes, may not magically appear simple and transparent in a simulation. Therefore, learners who lack a foundational knowledge of the subject may struggle to grasp the complex relationships within the simulation. Care must be taken to address both of these issues, creating a learner-friendly, simplified environment and providing transference to real-world applications.

To attend to these considerations, the present project proposed to integrate the use of an introductory web-based training module to provide a knowledge foundation, a simulation that applies constructivist principles to allow users to interact with the process and practice problem-solving skills, and an instructor-led portion which presents an opportunity for social interaction and possible clarification. According to Graham (2006), a blended approach provides the opportunity for improved pedagogy, increased access and flexibility, and increased cost effectiveness.

While web-based training and instructor-led training do not incorporate a constructivist environment or constructivist principles, according to Zenger and Uehlein (2001), both web-based training and instructor-led training produce their own advantages that when combined in a blended approach can lead to a highly effective and efficient training. The advantages of instructor-led training include:

1. The contagious enthusiasm of the facilitator

2. Learners' preference for learning in a social situation

3. Classroom accountability

4. Classroom experiences that provide opportunities for learners to interact, raise questions, practice and rehearse skills, and receive feedback from others

Advantages of web-based training may include:

1. Varied learning methods

2. The ability for learners to progress at their own pace

3. Many people learn more effectively on their own than in small groups

4. Potentially, more learning can occur in less time

When all methods, web-based training, simulation, and instructor-led training, are delivered at their best, a blended approach has the potential to combine the positive aspects of each method for a more complete and successful training environment. According to recent studies, blended learning is viewed as the most effective and efficient form of training in the United States (Sparrow, 2004). The convergence of e-learning, simulation, and traditional instructor techniques provides an opportunity to utilize integrated learning materials to meet different learning styles and aid in the transference of new knowledge to real-world business transactions.

Existing instructional materials

The selection of instructional materials to be used in this course was largely impacted by the design goals and constraints established by the client. Deutsche Bank stakeholders emphasized their desire for a simulation tool that would allow them to witness the cost/benefit ratio of controls on the transaction process. Therefore, the development of a simulation engine became of paramount importance within this project. Stakeholders also expressed the need for an interactive learning experience for employees that would only take them away from their desks for one day. Meeting the deadline for the first delivery of the training was also strongly encouraged. Thus, all issues that were considered out of scope for the timeframe of the project were designated to a later version of the course.

My search for existing relevant instructional material concerning the specific content of Deutsche Bank banking operations and controls resulted in finding only one very technical book written by a Deutsche Bank employee, Mike Simmons. While the book contained useful content information, it did not meet stakeholders' criteria of creating an interactive training experience including the use of a simulation. I concluded the information to be difficult for a new employee to understand as presented in a textual format. In order to understand a complex system, learners should be able to observe and manipulate the tasks within the process. While the book provided a good review for individuals with a clear understanding, it did not help those with little or no understanding. Therefore, I designed this course based on the content derived from Deutsche Bank subject matter experts to meet the stakeholders' criteria for the course.

Instructional Materials

The *Deutsche Bank Intro to Controls* course was created using a blended instructional approach. The entire banking transactions and controls training is a one day learning experience. Learners are engaged in approximately thirty to forty-five minutes of web-based training to provide a knowledge foundation, up to two hours of simulation to allow learners to interact with the process and practice problem-solving, with the rest of the time being allotted to instructor-led training to enable social interaction and clarification of concepts and terminology.

In a typical training scenario, learners are invited to attend the training by their managers. The training takes them away from their desks and work tasks for one day. The training occurs in a class-room environment that provides a computer for each learner. The training begins with the instructor welcoming the class and introducing the content of the training for approximately one hour. The learners then take the web-based tutorial on the computers. The instructor may divide the web-based training into various segments to provide instruction and allow for questions within different parts of the course, or allow the learners to progress through the course at their own pace, as much as possible. After the students have completed the first thirty minutes of the web-based training, including the money transfer module of the web-based tutorial, the instructor introduces the money transfer simulation, further explaining the various components and variables the students will be asked to manipulate. The students then run the simulation, making decisions concerning transactions and controls and receiving feedback concerning their decisions. The instructor discusses the simulation with the students, including what they have discovered and ideas for how to improve the simulation results.

The learners continue to work with the simulation until the instructor decides to move on and summarizes the lessons learned from the money transfer simulation. The first simulation portion of the training may take up to one hour. Students then complete the remaining fifteen minutes of the web-based training, including the module concerning the bond purchase transaction. For the next hour, the learners proceed through the bond purchase simulation, again making decisions concerning the tasks and controls of the transaction and receiving guidance and feedback from the simulator and the instructor. Students continue to work with the simulation until the instructor summarizes the course, reviews what they have learned, and continues the instructor-led portion of the training. The final instructor-led portion of the training may take three to four hours, during which the instructor provides further content which delves deeper into the course topics, and allows the learners to interact and engage in learning activities.

Originally, I had designed the training in a manner which allowed the learners to take the web-based training at their work stations to allow them to more freely work at their own pace, and then go to the instructor-led portion on a scheduled date. However, because of the international scale on which the course would be presented, Deutsche Bank stakeholders found it more feasible to combine all the elements of the training into a one-day training course. While this situation did not create a true blended training solution, the elements of the training still worked together to meet the objectives of the training and create an effective learning experience.

I was involved in the design of the training and the scripting of the web-based tutorial, in cooperation with Deutsche Bank subject matter experts and stakeholders. Other members of our design team included our graphic artist, David Horrocks, who

created the visual elements of the course, and our programmer, Sean McKee, who created the program for both the web-based tutorial and the simulation.

Instructor-led training

Deutsche Bank employee Mike Simmons designed and currently leads the instructor-led training. I provided some basic recommendations regarding content and instructional delivery, but this portion of the training was out of the scope of my involvement. It is assumed that the instructor provides a basic understanding of controls and transaction processes, clarifies misunderstandings, and provides opportunities for social interaction within the classroom setting.   The instructor-led portion is designed to be integrated within the other components of the training. The instructor introduces the web-based tutorial and the simulation, provides instruction, feedback, and suggestions throughout the web-based tutorial and the simulation, and summarizes and reviews the course content after the web-based tutorial and the simulation. He also provides additional and possibly more in depth instruction concerning course topics depending on the level of understanding of the students. The role of the instructor is to guide the learners through web-based training and simulation as needed and to act as a personal, knowledgeable, and enthusiastic facilitator of instruction.

Web-based training tutorial

The purpose of the web-based training is to provide learners with a foundational knowledge of transaction and controls concepts to prepare them to constructively interact with that knowledge within the simulation. According to Soulier (1988), in order to effectively instruct a learner via computer-based instruction, all computer-based instructional programs should reflect a concern for the individual user and for meeting

the needs of that user. The key is to find ways to make the computer more responsive or "friendly" to the needs of the individual. The design of the web-based training tutorial employs Soulier's principles and instructional strategies for individualizing and humanizing computer-based training. These principles include implementing a friendly organization, a friendly courseware design, and friendly evaluation and feedback.

   Friendly organization. Implementing a friendly organization entails structuring the program to be user friendly. This includes allowing for simple user control and navigational elements, self-pacing, and the division of content material into digestible chunks. A user friendly organization provides a sense of consistency and simplicity to allow users to easily maneuver through the course. The *Deutsche Bank Intro to Controls* web-based tutorial included the following elements to create a user friendly experience for the learner:

   1. Navigational elements: In cooperation with the graphic artist and programmer on my design team while designing the *Deutsche Bank Intro to Controls* course, we selected a simple user interface utilizing the Deutsche Bank branding colors and symbols, with navigational elements located along the bottom bar. Navigational controls include forward and back arrows to move to the next and previous frames of the course, a play/pause button to stop or start in the middle of a frame, and a menu to allow learners to move to different modules within the course. In the beginning of the course, students are instructed concerning the use of these navigational controls and a help feature is provided to allow learners to review navigation if needed later on in the course. Other useful features include a glossary button for students to review unfamiliar terms and an

audio transcript button to allow users to read along with the audio narration. Figure 1

displays these navigational controls.
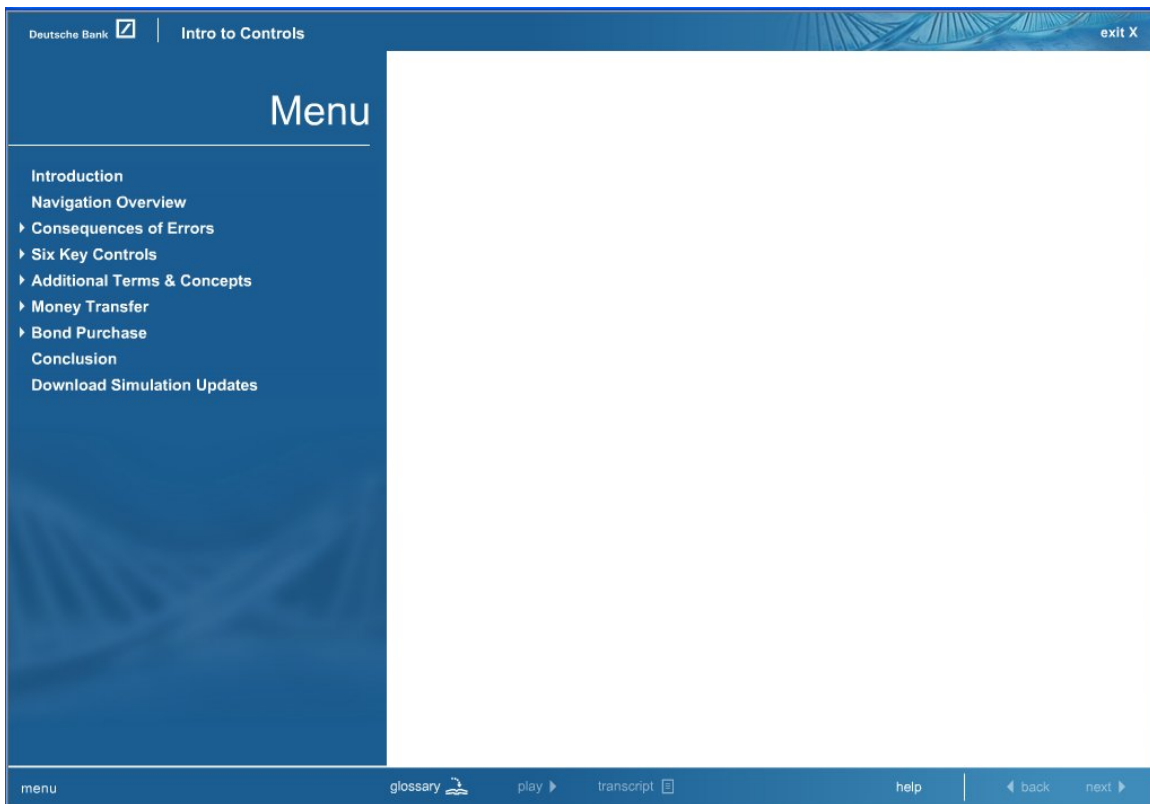
Figure 1. Screen shot of course interface and navigational controls.

2. User control: According to Soulier (1988), users want to feel that they are in

control at all times. While the training is designed for the learner to navigate through the

course in a linear fashion, learners are encouraged to move at their own pace, using the

forward and backward arrows at the bottom of the screen. More experienced learners are

encouraged to advance through the course using the open-access menu topics.

3. Division of course material: In cooperation with Deutsch Bank subject matter

experts, I divided the course into eight modules, ranging in time between three and ten

minutes each. The course modules incorporate two types of instructional frames to

present course content, teaching frames used to provide new information, and criterion frames used to assess learners' progress against a predefined set of criteria.

The modules include an introduction to the course, navigation overview, consequences of errors, six key controls, additional terms and concepts, money transfers, bond purchases, and the conclusion:

     1. Module 1 Introduction: The introduction acts as an attention grabber to engage the learners in the training in which they are about to participate. The introduction combines elements of music, text, and graphics within a Macromedia Flash animation to introduce the topic and emphasize the importance of what the learners are about to experience. Figure 2 displays a frame from the introduction.
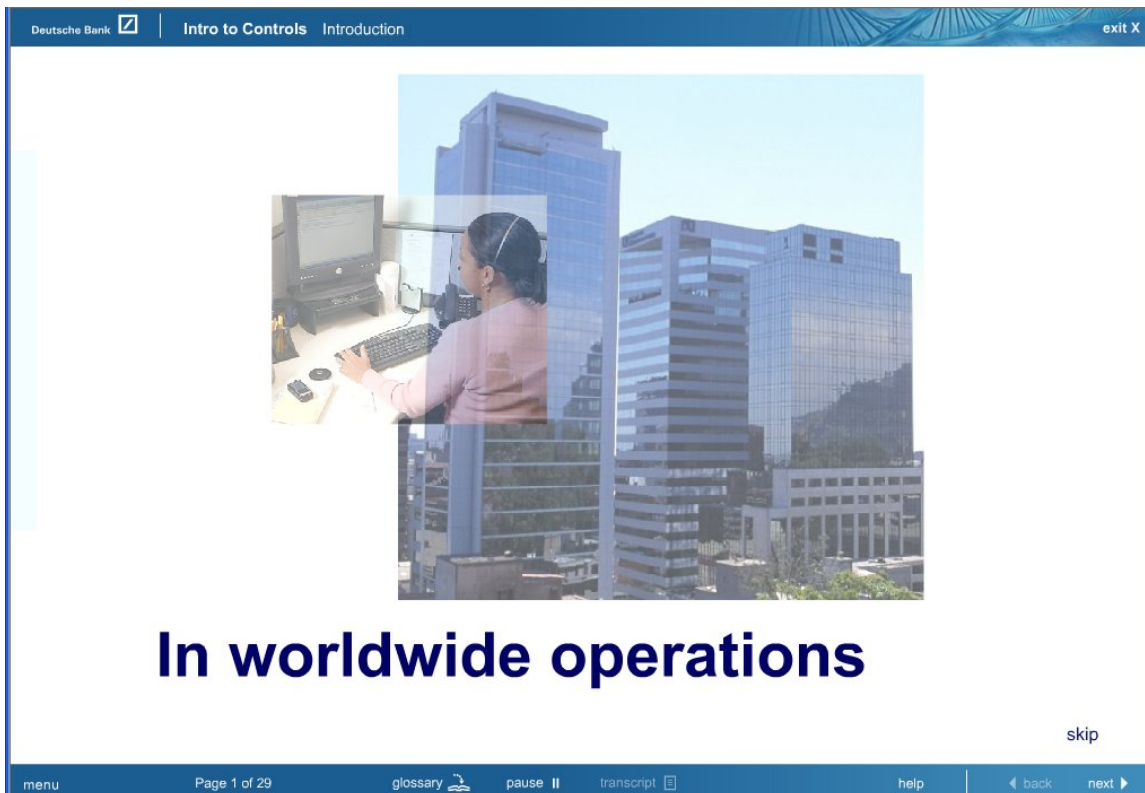
Figure 2. Screen shot of frame from module 1.

3. Module 2 Navigation Overview: The navigation overview lesson teaches the user how to get around in the course. In this frame, arrows point to different navigational elements while audio narration and text describe how to use the elements throughout the course. Figure 3 demonstrates a portion of the navigation lesson.
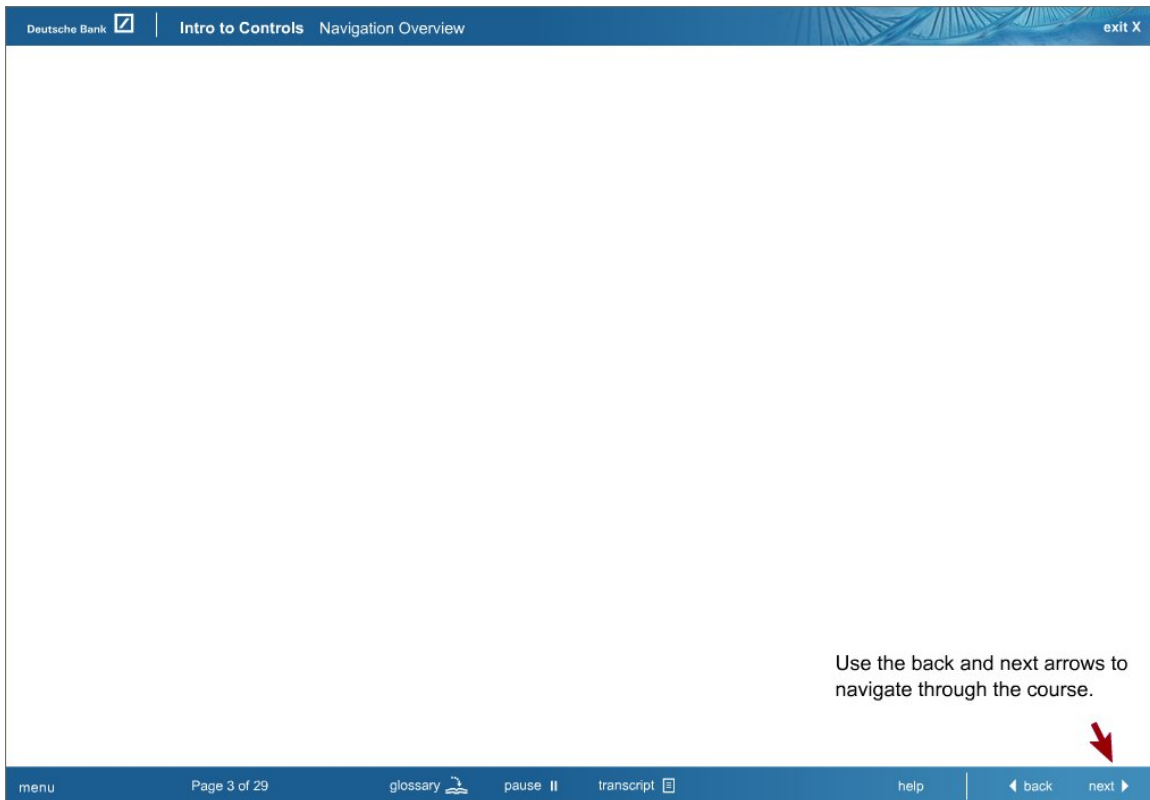
Figure 3. Screen shot from module 2.

3. Module 3 Consequences of Errors: The purpose of module three is to emphasize the importance of the course and the course objectives. This lesson instructs the learners in the negative consequences of errors resulting from fraud, miscommunication, and data entry errors within transaction processes. Negative consequences for a financial institution can include both monetary costs and reputation costs. This module prepares the learners for subsequent lessons which teach the control

instruments which can be used to fix errors. Figure 4 illustrates a concept taught within

module three.

Figure 4. Screen shot from module 3.

 4. Module 4 Six Key Controls: As one of the most important modules of the

course, the lesson identifies measures that can be implemented within transaction

processes to prevent errors. The controls are defined and illustrated with examples. A

graphic icon is used to depict the purpose of each control, which is then used later in the

simulation to help the learners recall the control's function. Figure 5 depicts a frame

from the control module.

Figure 5. Screen shot from module 4.

     5. Module 5 Additional Terms and Concepts: This module introduces the learner to additional new concepts and terminology that may be used in the course. Each concept is also illustrated with specific examples the learners can relate to. For example, Figure 6 displays a screen shot from this module which defines the concept of controls. This figure demonstrates a representation of a graphic that is also used later on in the simulation. The course uses many graphics and animations within the web-based tutorial that mirror what the learner will see later on in the simulation to allow them to be familiar with the look and feel of the simulation when they are presented with it.

Figure 6. Screen shot from module 5.

6. Module 6 Money Transfers: This module depicts the tasks and processes involved within the money transfer transaction. A money transfer involves the transfer of funds from one location or party to another. This lessons leads directly into the money transfer transaction simulation to allow the learner to practice using the information they have learned in the module. Figure 7 demonstrates a lesson taught within module six.

Figure 7. Screen shot from module 6.

7. Module 7 Bond Purchases: The bond purchase lesson describes the tasks involved in a bond purchase transaction from the time a trader makes a deal until the transaction settles. This module leads directly into the bond purchase simulation to allow the learners to quickly begin using the information they have learned to make decisions. Figure 8 illustrates a frame from the bond purchase module.

Figure 8. Screen shot from module 7.

8. Module 8 Conclusion: The conclusion summarizes and reviews the lessons learned within the web-based training. The narrator reemphasizes the importance of the concepts for the learners and explains the relevance of the topics to the employees' work tasks. Figure 9 depicts the conclusion module.

Figure 9. Screen shot from module 8.

Friendly courseware design. A friendly courseware design allows users to function in ways that are natural or intuitive to them. According to Soulier (1988), a computer-based training should incorporate instructional strategies and design techniques that both appeal to the senses and are simple and efficient. To meet these design goals, I designed the training to incorporate the following techniques: the use of a mentor character to present information and the inclusion of teaching frames that present rules, concepts, and examples and provide interaction.

A mentor character connects the elements of the course together and provides continuity. Mentor characters provide a personal touch to the web-based training. Mentor characters fulfill the following roles:

1. Present information

2. Ask questions and assess understanding

3. Provide feedback and coaching

4. Offer tips and hints

5. Share experiences and tell relevant stories

According to the learner questionnaire, sixty-nine percent of learners surveyed reported they would look to a seasoned operations manager as a mentor figure. Therefore, the web-based training uses an experienced operations manager as a mentor character to guide the learners through the course, provide instructions and feedback, and present content. Figure 10 presents a screen shot of the course mentor character.
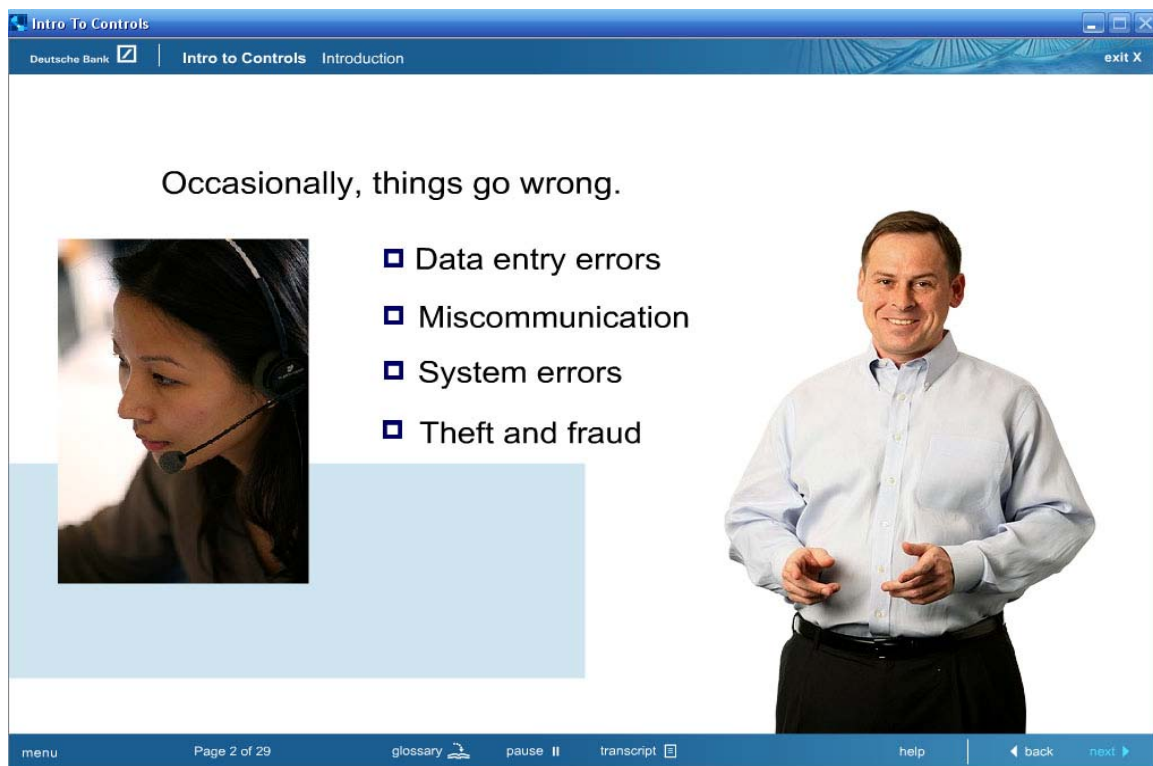

Figure 10. Screen shot of a mentor character.

Teaching frames instruct the learner in new rules, concepts, and examples, and provide opportunities for interaction with the new material. Soulier (1988) uses the term *dialog frame* to refer to any teaching frame that reflects the function of an instructional frame that acts as a conversation between a student and a teacher, where the teacher is the training program conducting a dialog through the medium of a computer. Instructional frames that employ instructional strategies designed to engage the learner allow the participant to feel a part of the training and become a part of the experience. The *Deutsche Bank Intro to Controls* web-based tutorial uses presentation screens and interactive screens as instructional frames to teach course content.

Presentation screens utilize the RULEG and EGRUL approaches to present new concepts and rules. The RULEG approach emphasizes the presentation of the rule, followed by examples of the rule. The EGRUL approach differs from the RULEG approach in the sequence in which examples and rules are presented to the learner. Followers of the EGRUL principle believe that when learners see examples before learning the rule, they will have a context in which to place the rule, and it will have more meaning and be learned faster (Soulier, 1988). The *Deutsche Bank Intro to Controls* training uses both of these techniques to teach new concepts and rules to meet the needs of diverse learners.

Presentation screens use text and graphics to help learners become familiar with course material. Custom graphics, output graphs, charts, and process diagrams provide a visual representation of the course content and difficult concepts. The *Deutsche Bank Intro to Controls* course includes custom graphics to illustrate the trade cycle and the application of controls. To give a fuller understanding of the controls, a visual

representation is presented within the animations, and then a graphic icon or symbol of those controls is used in the simulation. Figure 11 provides an example of a presentation screen.

Figure 11. Sample presentation screen.

The *Deutsche Bank Intro to Controls* course also includes interactive activities that allow learners to visually and manually interact with the concepts and examples that are presented. Interactive activities help keep learners engaged and interested in the material being presented, while allowing them to work at their own pace. An example of an interactive activity used in the *Deutsche Bank Intro to Controls* course is an item swap activity. In an item swap activity, the user clicks or drags various items on the page to reveal more information. Figure 12 is an example of an item swap activity in which the learner clicks on the pictures to reveal more information. In Figure 13, the learner drags

the slider over the blurry pictures and the pictures come into focus while more

information appears.
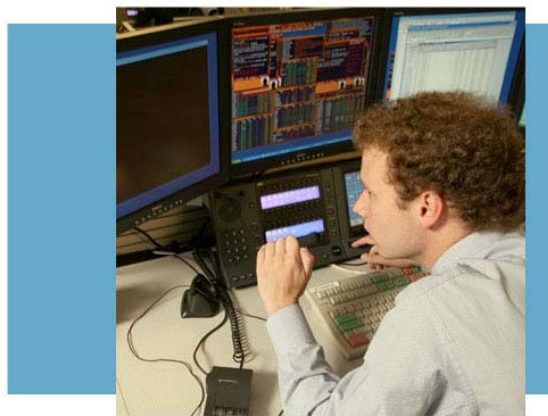
Figure 12. Sample item swap clicking activity.

Figure 13. Screen shot of an item swap dragging activity.

Friendly evaluation and feedback. An important part of the learning process is

periodic assessment and constructive feedback. Assessments and knowledge checks

allow learners to assess their own understanding or misconceptions, as well as

providing opportunities to provide clarification and feedback. One of the functions of

the simulation in this course is to act as a summative evaluation of the learners'

understanding of course principles. However, throughout the web-based tutorial, the

learner is presented with various assessment frames to check their understanding of

course concepts. The web-based training uses both matching response knowledge

checks and multiple choice knowledge checks to assess learner progress throughout

the course.

1. Matching activities: The learner clicks on an item and drags it to its correct location or category. For example, in the segregation drag and drop activity in Figure 14, the learner is asked to decide which of the tasks in the boxes each office or staff may be involved in. As is depicted in Figure 15, learners must drag the tasks that don't pertain to the personnel to the removal bucket. The learners receive feedback concerning the items they selected. Correct answers enter the bucket and disappear; incorrect responses bounce back to their original location.
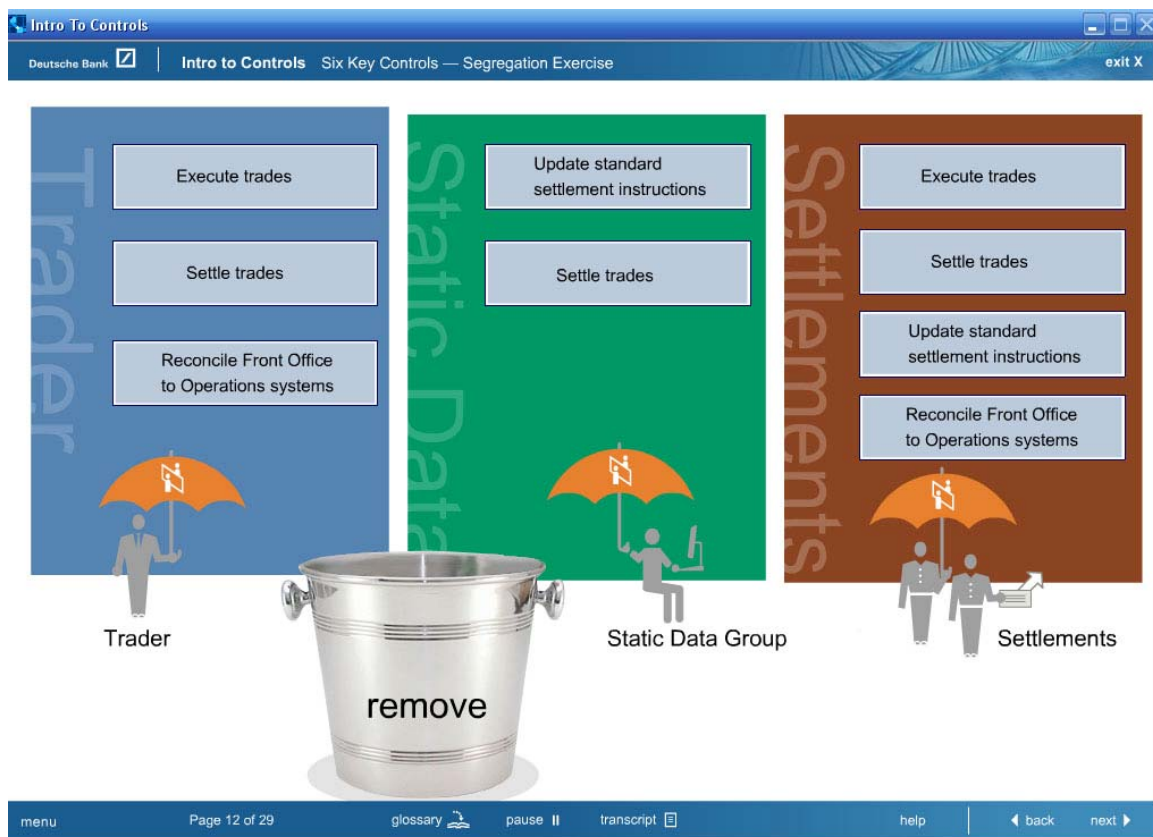
Figure 14. Sample drag and drop activity.
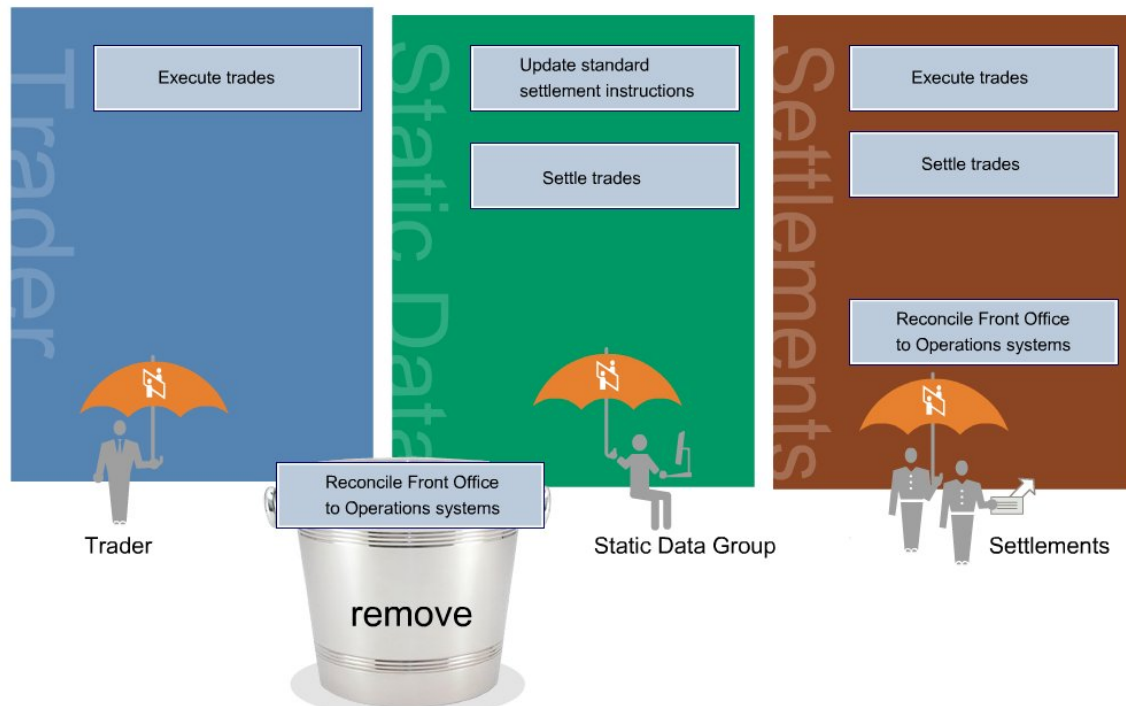
Figure 15. Drag and drop activity showing item being removed.

2. Multiple choice knowledge check: The learner is asked to select the correct answer concerning learned concepts from two or more plausible choices. In the example shown in Figure 16, the learner is asked to determine a fail cost based on certain information provided in the question stem. The learner clicks on a radio button and receives feedback concerning the selection.

Let's suppose our Trader executed a deal to purchase 20,000 shares of BP Oil at a cost of 1,200,000 Euro. Because of a miscommunication error on our part, we have insufficient funds to pay for the seller's delivery of securities on value date. The trade fails for one day at an interest cost of 5%. What is our fail cost?

- A. 60,000 Euro
- B. 16,666 Euro
- C. 1,670 Euro
- ✓ D. 167 Euro

Correct! This fail would cost 167 Euro.

Click next to continue.

Figure 16. Sample multiple choice knowledge check.

Simulation

     The *Deutsche Bank Intro to Controls* simulation was designed and created based on the principles and ideas of constructivism. According to constructivist thought, learning is an active process in which learners construct new ideas or concepts based on their current and past knowledge. Learners in a constructivist environment are actively involved and encouraged to be independent thinkers and problem solvers. Learners are provided opportunities to hypothesize, to analyze, to interpret, and to predict. Proulx (2006) proposed the following six constructivist principles for creating an instructional program which were applied to the simulation: learning is based on prior knowledge, knowledge must be useful, the learner plays a role in communication and learning, mistakes are meaningful, creativity and invention are encouraged, and verbalization is important.

Learning is based on prior knowledge. Constructivism attests that learners are not simply blank slates, but that the learner interprets and adapts new experiences in relation to his or her previous understanding. Prior knowledge and experience is crucial to the learning event, as knowledge is construed in relation to it. Proulx (2006) proposed that constructivists recognize learners as individuals possessing rich previous knowledge and that instructors can utilize that knowledge to build further meaningful understandings. The *Deutsche Bank Intro to Controls* simulation builds on the knowledge provided in the web-based tutorial as well as the knowledge the learner brings from his or her own personal work experiences. The simulation asks learners to recall what they have learned concerning controls and transactions and to make predictions and solve problems regarding those controls and transaction tasks.

Knowledge must be useful. Constructivists also propose that for knowledge to be learned, it must be useful and meaningful. To make learning meaningful, instruction must be anchored in realistic and authentic settings. Situated learning encourages students to consider what real people would do in a real environment (Driscoll, 2000). The simulation allows users to interact with the information they have learned in a situated environment. Designed in partnership with both our design team (consisting of our graphic artist, programmer, and myself) and Deutsche Bank subject matter experts and stakeholders, the simulation portrays the lifecycle of a transaction. Tasks are laid out divided among the different offices in the Deutsche Bank corporation. As the simulation is run, learners can view how the transaction would occur in different parts of the corporation throughout its lifecycle.

The learner plays a role in communication and learning. As stated previously, learners are not blank slates or passive sponges accumulating knowledge, and, therefore, simply explaining a concept will not automatically make them understand (Driscoll, 2000). The learner must take an active role in constructing knowledge. Constructivism encourages learners to make sense out of material, solve problems, and demonstrate their understanding. Learners perform the following tasks while proceeding through the simulation:

1. As the learners open the simulation, they are presented with a transaction flow. Transaction tasks are laid out among the different offices involved in the process. A selection of controls is located at the top of the screen. Figure 17 demonstrates the design of the simulation.

Figure 17. Opening screen shot of the simulation.

2. The learners are asked to decipher the relationship between controls and costs in the transaction process, make decisions based on that relationship, and predict the outcomes of their decisions. During the simulation, learners select controls and add them to the trade process to discover how these controls impact both the number of errors incurred in the trade process and the overall cost of the trade. Learners apply controls to specific tasks within the transaction process by clicking on their icons and dragging them to the task on which they would like to apply the control. At times, a popup box will appear asking the user for more information concerning how they would like to apply the control to the task. For example, a reconciliation control involves comparing different data sources to ensure that they match. As is demonstrated in Figure 18, the users are asked to determine what data sources they would like to compare. The popup box also informs the user of the cost of the control per transaction. The learner can then save the controls as positioned or move them to different locations.

Figure 18. Learner task within the simulation.

3. Learners can receive assistance during the simulation, review principles, and gain additional information by clicking on the task images or rolling their mouse over the control icons. A popup box appears describing the item and its purpose. Figure 19 displays a popup help item.

Figure 19. Popup help box within the simulation.

    4. After the learners have selected their controls and applied them to specific

tasks within the transaction, they may choose the number of transactions to simulate, the

speed of the simulation, and click the start button. The slow speed enables the learners to

see each transaction proceed step-by-step. When an error occurs, a red exclamation mark

appears over the task to notify the learner. The fast speed runs quickly through all

transactions. The simulation was designed according to a mathematical model that

computes the costs for the errors and where they would occur according to the user's

selections. The model allowed for some randomization to simulate a real world scenario.

For example, sometimes errors do not occur in the real world even without the

application of a control, depending on the circumstance. Figure 20 depicts the running of

a simulation with an error occurring on one of the tasks.
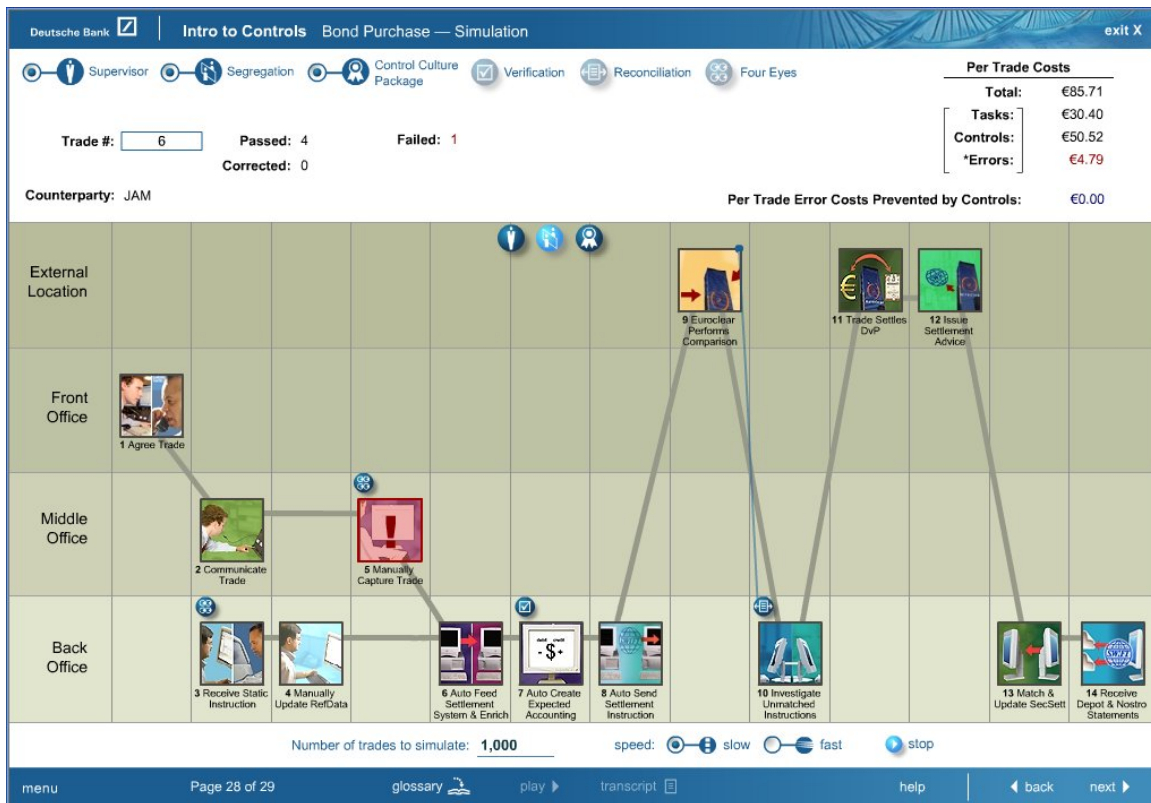
Figure 20. The simulation playing through a transaction.

5. After the simulation has finished running, a popup box appears informing the

learner that it is done and asking them to evaluate the costs and errors located at the top

of the screen. Figure 21 depicts the simulation complete popup box.

Figure 21. The simulation complete popup.

6. Learners can also click on each task to receive feedback concerning the errors of each task and recommendations concerning the types of controls that could have been used to prevent the error from occurring. Figure 22 displays a task error report.
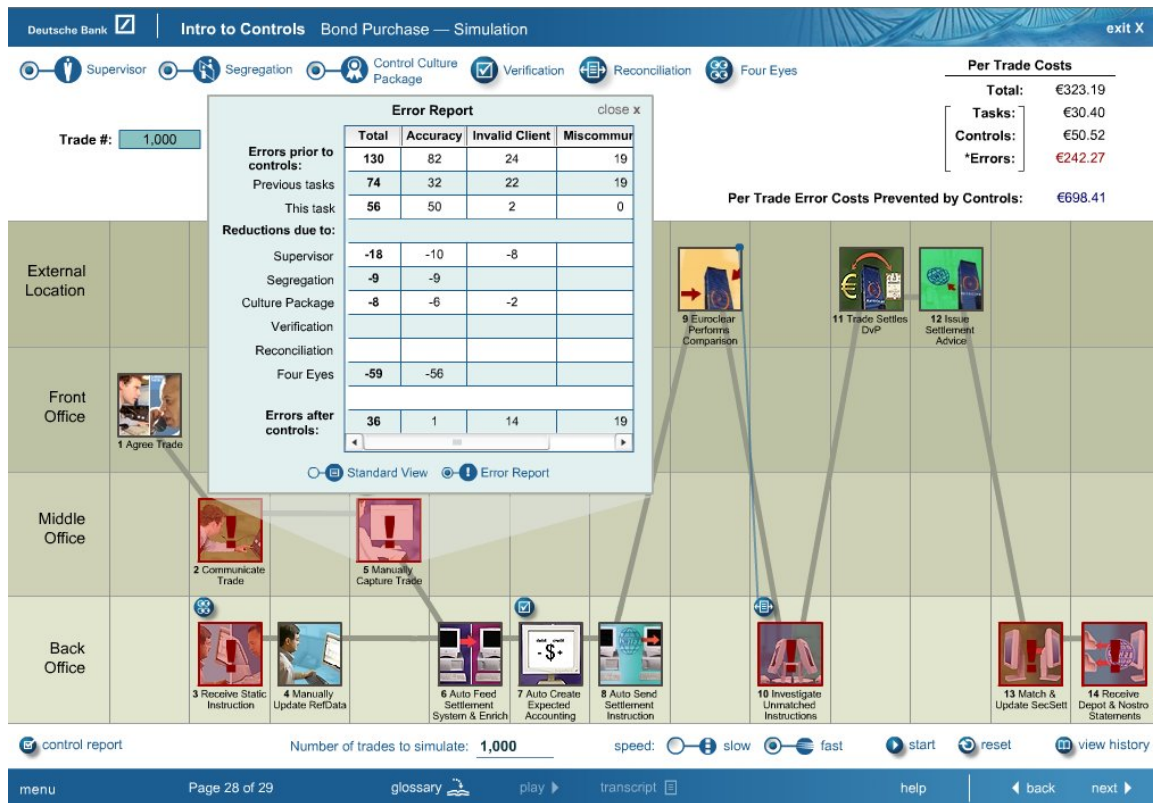
Figure 22. Simulation task error report.

      7. Learners can click on the control report button located at the bottom of the simulation to display the used for all tasks and their subsequent costs. Figure 23 demonstrates the control report box.
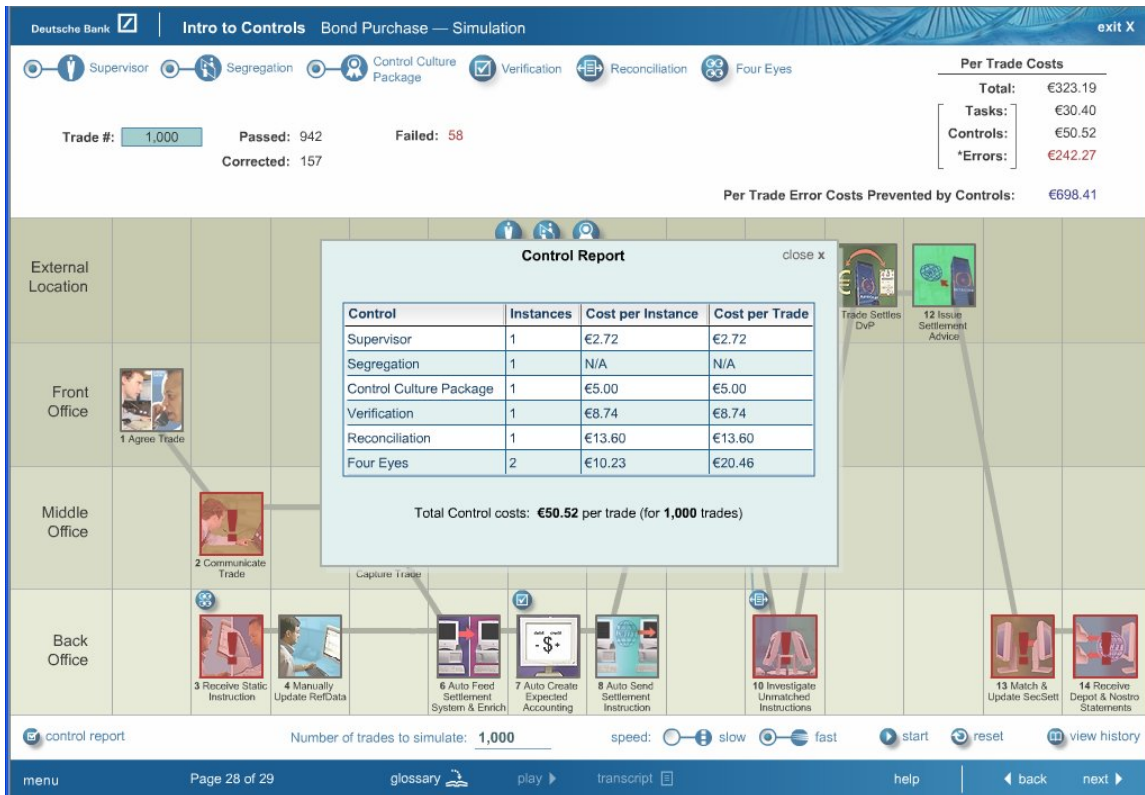
Figure 23. Simulation control report.

8. Learners are then asked to adjust their control selections by removing or adding controls from the tasks or by clicking the reset button to start over. They may then rerun the simulation to receive different results. Figure 24 demonstrates a control being readjusted.

Figure 24. Simulation adjustment.

9. After having run the simulation for the number of cycles desired by the instructor, learners can click on a view history button which displays the results of each time they ran the simulation, including the number of errors and costs incurred, types of controls applied, and the potential errors and costs prevented through the use of the controls. Figure 25 displays the view history box. Learners can click the create graph button to evaluate cost patterns within the simulation cycles run. Figure 26 demonstrates a sample graph.

Figure 25. Simulation view history box.

Figure 26. Cost analysis graph.

10. Finally, the instructor conducts a debriefing session with the entire group of students to discuss lessons learned from the simulation and allow the students to express their findings. The instructor should also be available throughout the simulation

experience to provide further guidance and feedback concerning the simulation tasks and results.

Mistakes are meaningful and creativity and invention are encouraged. Constructivism argues that mistakes are an important part of the learning process. When a mistake happens, participants can learn from the mistake by studying it and using it to better understand the concepts being learned (Proulx, 2006). Constructivists encourage reflexivity, the process by which students analyze their own thought processes and think about how they solve problems and arrive at conclusions. By encouraging reflexivity, learners can produce new ideas by combining elements of knowledge that are pre-existing.

As described in steps five through nine above, the simulation provides a tool for analyzing student choices concerning the impact of controls on the trade process and the optimal allocation of controls. Learners may reflect upon their choices and change the settings on their transactions to evaluate the impact of different choices upon their cost and error results. The advantage for students throughout the simulation experience is the ability to experiment with different variables and make discoveries concerning when controls will be useful in their jobs and when the costs outweigh the benefits.

Verbalization is important. One important aspect of constructivism is the inclusion of verbalization through class discussion and feedback to help learners retain and clarify their understanding. When learners verbalize their understanding, they strengthen the meaning of what they assert, become aware of weaknesses in what they are explaining, and create links with other ideas (Proulx, 2006). Group interaction also exposes the learner to multiple perspectives concerning the topic. As depicted in step ten

above, the instructor is encouraged to interact with the learners throughout the simulation process. While the instructor-led training was out of the scope of my involvement in this project, I did encourage the Deutsche Bank instructor to incorporate class discussion and feedback concerning the simulation into his curriculum.

Evaluation

According to Kirkpatrick, training programs may be evaluated at any of the following four levels: reaction, learning, behavior, and results (Kirkpatrick, 1994). The reaction level includes participants' reactions to the training program. This project implemented mechanisms to allow participants to express their opinions regarding the training to the company and the instructor. The learning phase examines the extent to which participants change attitudes, improve knowledge, and/or increase skill as a result of attending the program. This will be the main focus of the evaluation for this project.

Kirkpatrick's final elements of evaluation, behavior and results, are not covered within the scope of this project. According to Kirkpatrick, no evaluation should be attempted until trainees have had an opportunity to use the new behavior or to produce results (Kirkpatrick, 1994). While the high-level objective for this training is to enlighten employees concerning the impact controls have on the costs and errors of transactions, most employees work directly with certain controls but may not have opportunity to implement all controls taught in the training for months, or even years, when they have been assigned tasks of management or supervision. Thus, the evaluation for this project will focus on measuring learning. However, Deutsche Bank is committed to performing further follow-up within the next few years to evaluate changes that resulted from the

training by examining the behavior of their employees and the levels of errors, fraud, and other factors impacted by the use or misuse of controls in transaction processes.

Formative evaluations conducted within the project included periodic client reviews, subject matter expert reviews, and internal quality control evaluations by Allen Communication employees. Feedback was transmitted through the use of the Allen Communication project portal, as well as small group conference calls, and e-mails. As subject matter experts and other reviewers assessed the course, the portal allowed reviewers to click a link which enabled them to enter their feedback and review the feedback of others. Changes that resulted from formative evaluations included content changes, organization changes, and the generation of new ideas for presentation of material.

This project also utilized two pilot studies: a pilot group research study and a field trial feedback and response group. The field trial feedback group provided responses as to the overall effectiveness of the training, including areas that could use improvement. The research study used a small pilot group to test the impact of the simulation on learning scores in comparison with learning based on the web-based animation training alone. Both groups provided valuable information regarding the use of the transaction and controls training.

Field Trial

According to Cennamo and Kalk (2005), the purpose of a field trial is to better understand how well a learning product works in its intended environment. The field trial included the delivery of the training to a sample of its intended learners within its intended setting. The intent of the field trial was to gather data concerning the

effectiveness of the training in achieving its intended outcomes, learners' affective response to the training, the ease of delivery of the training, and suggestions for improvement.

Description of participants. Thirteen participants took part in the field trial training. These participants were all operations employees with six months' to two years' experience in operations banking. All participants had little knowledge of controls and the overall transaction processes.

Procedure. The intent of the field trial was to obtain qualitative and ethnographic data from the instructor, subject matter expert, and students concerning the content, delivery methods, and effectiveness of the course. This data was obtained in two ways. First, the instructor and subject matter expert were asked to evaluate the delivery of the training through observations and one-on-one interviews with members of the class in order to obtain feedback. Second, at the conclusion of the training, the learners were asked to complete a questionnaire concerning their subjective attitudes toward the course. Where possible, scores from the questionnaire were quantified and evaluated to determine students' general impression of the training.

Results. The subject matter expert and training instructor were asked to evaluate the course in three areas: delivery, content design, and attitudes toward the course. These evaluations were derived from observations and student one-on-one interviews. Feedback from the instructor and subject matter expert was used to create improvements within the course and its administration.

First, the instructor and subject mater expert provided feedback concerning the delivery of the training. Responses concerning the delivery of the training assessed the

formality of the instructional setting, the time and pace of the training, the location of the instructional setting, group size, and the deployment of the course. Responses concerning the delivery of the course included the following:

1. Substantially shorten the amount of time used to explain the simulator. They found it easier to navigate than we had anticipated.

2. Shorten the amount of time spent (or increase the pace) on the first two sections – verification and four eyes.

3. Increase the pace of the entire training and shorten it by one hour. The consensus was that they would like to do this class in about seven hours.

4. Re-work the technical deployment of the instructor-led portion of the training, including adding more group discussions and activities.

5. Clarify the target population as having a minimum of six months' banking experience and a maximum of three years.

6. Have the instructor experiment with different approaches for getting students to respond to questions.

In terms of content design, the instructor and subject matter expert evaluated how well the course met its instructional objectives in transferring the content to the students. This assessment analyzed the size of the instructional chunks, instructional strategies employed, and the level of difficulty of the various instructional modules. Responses from this portion of the field trial included the following:

1. Redesign the four eyes section. This section received the most critical feedback. Eliminate the student drag and drop knowledge check activity in this section.

Consider showing one or two examples on the main screen. Analyze how to address "this is too basic" and "it is self-explainable" feedback.

2. Create more structure around the simulation section. They don't want to just play, they want more lessons and insights from this component of the class.

3. We need to assemble the pre-class reading material for the bond purchase section.

4. One or two students wanted more information on how segregation works in the simulator.

Finally, the attitude portion of the instructor and subject matter expert evaluations provided useful information concerning the learners' affective responses to the training. These responses included feedback concerning learners' likes and dislikes concerning the course, students' suggestions for improvement, and information concerning what the learners found useful and applicable to their jobs. This feedback included the following reactions from the learners:

1. They like the exercise part of the video and want more. They also want more "near miss" answers and more difficult exercises.

2. We received very positive feedback on the mixture of learning methods and variety of modules.

3. Students responded that they will remember "placing controls at effective points" from the course, that applying more controls does not necessarily equal better financial outcomes, putting controls in the right order, questioning controls that are already in place, and analyzing processes to ensure control.

4. Items that students didn't learn about controls within the course that they wanted to learn included: "Do real world managers accept that there will be errors? How does this relate to people who do not work in a line?" They also want to discuss more about the cost versus control trade-offs.

5. The 'Opportunity for Error,' '6 Key Controls,' and simulator sections received the strongest positive feedback.

6. Students also said they liked the instructor, his knowledge, and his focus on them. Students stated, "he did not lecture at you," and "he kept our attention."

7. Students liked the animations. Voice and speed was appropriate.

8. Students recommended the following improvement for the instructor-led portion of the training: asking questions specifically aimed at individuals rather than to the group.

9. Almost all believe they have the knowledge and authority to raise control issues and opportunities to their managers.

Qualitative data was also obtained from the learners through a post-training questionnaire. The questionnaire was composed of two parts: a free response portion and an instruction rating portion. The free response portion allowed students to provide feedback concerning what they learned from the course and recommendations for improvements. Students reported having gained a better understanding of controls, including control types, how and where to implement them, the cost/error ratio of controls, and questioning and analyzing processes to evaluate if a control is needed. The learners recommended implementing more explanation of various factors in the

simulation that maximize effectiveness, including more group discussion and increasing the pace of the training.

In the instruction rating portion, learners rated their impressions of the course on a five point scale. Feedback from the ratings was quite positive. Ninety-two percent of the learners reported having a positive impression of the course. Nearly eighty-five percent of students believed the training met the stated objectives. Ninety-two percent reported that the content was relevant and could be applied to their work. All students reported that a suitable combination of training approaches was used. The results of these ratings are reported in Table 1.

Table 1

Mean Rating of Training

Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Positive Impression	0.00	0.00	15.38	46.15	38.46
Met Objectives	0.00	0.00	7.69	46.15	46.15
Suitable Training Approaches	0.00	0.00	0.00	61.53	38.46
Relevant Content	0.00	0.00	7.69	61.53	30.77
Means	0.00	0.00	7.69	53.84	38.46

I assessed the feedback derived from the field trial and determined how the course could be improved, based on student, subject matter expert, and instructor reactions. Changes that resulted from these comments include: shortening the time to explain the simulation, increasing the pace of the course where possible, clarifying the target

population as having a minimum of six months' banking experience and maximum of three years, and eliminating exercises that were considered too basic. I also encouraged the course instructor to evaluate and change the instructor-led training to meet the suggestions of the class, including the need for the instructor to conduct a more in depth debriefing session concerning the simulation and to increase the pace of the class where feasible. Some changes were considered out-of-scope for the project, such as the creation of more difficult exercises and the instruction of more complex items, and, therefore, were assigned to a subsequent version of the project.

Pilot Research Study

A small research study was conducted to determine the impact of the computer simulation on the learning and retention of banking processes. It was predicted that learners would obtain higher scores on an assessment after taking both an introductory tutorial and a simulation than the scores on an assessment after only the introductory tutorial. The reasoning behind this hypothesis was that learners who were able to actively interact with the information in a simulated environment would have higher learning and retention rates than if they were not exposed to the simulated environment. As a result, the simulation would allow for greater understanding of the banking operations process as a whole.

A pilot group of seven banking employees took the web-based tutorial training and then took an assessment. These participants then interacted with a simulation and took the same test again. A repeated measure t-test analysis indicated an increase in mean test scores between the post-animation and post-simulation tests. However, with

this small number of subjects, the difference was not large enough to show a significant difference in scores as a result of the simulation.

Participants. A sample population of seven Deutsche Bank operations employees participated in this pilot study. These employees had less than two years' experience with investment banking, and most participants stated they had received little or no controls or operations training. Thus, this study provided the opportunity to test subjects who had little prior knowledge concerning the topics presented.

Materials. A *Deutsche Bank Intro to Controls* web-based tutorial and simulation were used in the study. The ideal administration of the study would have been within the actual learning environment in the classroom setting along with the instructor-led portion of the training. However, due to client constraints, the training environment was unavailable for the study. Therefore, Deutsche Bank employees accessed the web-based training and simulation at their office computers. In addition, a test was administered at two intervals during the training.

Procedure. All participants went through the web-based training to obtain a foundational knowledge and then took the post-animation assessment. All subjects then ran the simulation (the treatment) to practice problem solving and decision making, and took the post-simulation assessment.

Scores from both assessments were obtained, quantified, and evaluated to compare any differences. Higher scores were interpreted to mean that higher levels of learning and retention occurred, whereas lower scores signified that less learning and retention occurred.

Results. Results indicated that the mean assessment score after taking the simulation was 83.5 (M = 83.5, SD = .837), whereas the mean assessment score after only taking the animation was 75.67 (M = 75.67, SD = 15.63). A repeated measures t test performed on these differences indicated that the difference between these two means was not statistically significant t(5) = -1.6, p > .05.

Discussion. The results of the study did not support the hypothesis that learners would obtain significantly higher scores on an assessment after taking both an introductory training tutorial and a simulation than the scores on an assessment after only the introductory training. While the results indicated that there was an increase in mean assessment scores, the increase was not great enough to show statistical significance. Learners' scores did not improve substantially enough to signify that the implementation of the simulation caused an increase in the learning of the information. The finding from this study does not provide ample evidence to support Towne's (1995) claims that simulations provide an opportunity for increased study, observation, and retention of new systems. More research is needed to discover the impact of simulations on learning and retention rates.

The simulation was not implemented in its intended learning environment which may have resulted in unsubstantial results. In the proposed learning environment, learners proceed through the simulation with an introduction from the instructor, intermittent feedback and instruction provided throughout the simulation, and a debriefing session after they have concluded the simulation. However, due to constraints in this study, participants accessed the web-based tutorial and simulation from their office computers. They were asked to practice manipulating variables and observing cost and

error results, but were not given specific tasks to complete or much guidance or feedback concerning their decisions. Therefore, it may be concluded that the simulation may need to be built into the instructor-led portion of the training or that the learners need to be given more guidance and direction concerning their tasks and learning outcomes during the simulation experience to produce a greater response in assessment scores.

An alternative explanation for the study results includes the amount of time the learners spent with the simulation versus the animation. Whereas participants spent between thirty to forty-five minutes on the introductory web-based animation, participants spent approximately five to ten minutes on the simulation. In the intended setting, learners would spend up to two hours working with the simulation. The lesser amount of time spent on the simulation would allow less opportunity for learners to actively interact with the information and, therefore, might produce a less significant result.

Also, the choice of assessment materials for both the web-based tutorial and the simulation may not have met the learning objectives for the different components of the course. The learning objectives for the web-based tutorial and the simulation are different. Whereas, the purpose of the web-based training is to teach the learners new concepts and rules concerning banking transactions and controls, the simulation allows learners to apply these concepts and engage in problem solving and decision making. Thus, while a multiple choice test may be appropriate to measure the learning in the web-based tutorial, other testing methods, such as performance-based tests, may be more appropriate to measure learning from the simulation.

This pilot group was the first to receive the training. The limited number of participants produced a limitation in analyzing results. Future research with greater sample sizes is needed as this course is fully implemented in its intended environment, to examine the relationship between the simulation and learning and retention rates, as well as learners' understanding of the banking operations process as a whole.

The difference in the standard deviations between the pretest and posttest scores also raises questions concerning the impact of the web-based tutorial versus the simulation. After taking the web-based tutorial, pretest scores had a standard deviation of 15.63. Such a large standard deviation demonstrates a wide difference in student scores, indicating that the web-based training was very useful for some students, but not useful for others. However, the posttest scores had a small standard deviation of .837, indicating that students' scores were closer in range. Future research should examine the causes for the differences in standard deviation between pretest and posttest scores.

Finally, the present findings are consistent with the hypothesis proposed by Towne, de Jong, and Spada (1993) and Kirkley and Kirkley (2005) that the challenge of simulations lies in the difficulty in designing a complex system to appear simple. According to this view, complex systems may not magically appear simple and, therefore, learners may still struggle in attempting to make sense of a complex simulation. While the inability to conduct the study in its intended environment prevents me from making any conclusive inferences, the small rise in scores in the first and second assessment may also have been caused by the learners' struggles to grasp the complexity of the simulation.

However, the small improvement in mean assessment scores demonstrates that simulations can assist in the training environment. As Kirkley and Kirkley (2005) proposed, simulations provide learners with a conflict or puzzlement stimulus to interact with information in a constructivist way. Further research should examine the role of constructivist theory in the design and development of training simulations. The learning of any number of complex systems, from banking and business systems to military and avionic systems, may be improved through the study and use of computer simulations.

<div align="center">Conclusion</div>

Critique

This project provided opportunities to examine both the negative and positive aspects of creating a blended training solution. Both the training product and the training process brought to light certain strengths and weaknesses in the development of a training solution. Within this section, I will describe some of my insights while developing this training product.

Product strengths. Strengths of the *Deutsche Bank Intro to Controls* training course include the different types of instructional strategies it employed, its interactivity, and its effectiveness in conveying a complex system. High qualitative results revealed that learners enjoyed the training, thought they could apply it to their work, and that the different instructional strategies were appropriate for various learning styles. A blended approach allowed learners to witness and interact with a complex system of which they may only see a part in their daily work activities.

Product weaknesses. Product weaknesses included the time and pace of the training. The training was designed to occur within a one-day course, but learners

reported the course moved somewhat slowly and portions of the course were oversimplified or redundant. Steps have been taken to reduce learner fatigue in the future through a quicker pace and more breaks throughout the course, as well as a reduction in the items that were reported as too simple or redundant.

Process strengths. Throughout the training process, I had a good working relationship and coordination of efforts with the subject matter expert and instructor of the training course. Receiving frequent feedback through regular review cycles and team meetings prevented any unforeseen difficulties from creeping in at the end of the project. Both the subject matter expert and the instructor for the course were passionate about the program and helpful in gathering content, audience analysis, and feedback data. An enthusiastic and committed project team facilitated the development of creative instructional strategies, helped meet timeline goals, and assisted in gathering constructive feedback and critiques.

Process weaknesses. While this training program provided the opportunity to build a training solution designed to portray a complex system, the limited time and scope of the project restricted my ability to see the long-term effects of the training for the corporation. This course is designed for a global corporate audience, given over the next few years. My participation in the project is limited to the design and delivery of the training course. According to Kirkpatrick, summative evaluations should not be attempted until trainees have had an opportunity to use the new behavior or to produce results (Kirkpatrick, 1994). Many employees will not have the opportunity to implement all tasks and controls taught in the training for a period of time. A true evaluation of the course effectiveness cannot be completed until the course has reached more of its

intended audience and the learners have had an opportunity to apply these principles to their work tasks.

Lessons learned. The size and scope of this project provided many opportunities to examine the processes involved in creating a training program designed for a large-scale audience and utilizing several instructional strategies. I learned several important lessons during the course of this project. First, I learned that in working with a client, focusing on the needs of the audience is first and foremost. The stakeholders involved in this project were very enthusiastic about the course, particularly concerning the application of the simulation tool to analyze costs and errors within their corporation. I found it necessary to help stakeholders focus on the needs of the audience in designing the training as an instructional program, and not simply as an analytical tool. Also, when conducting an evaluation concerning a training product, it is necessary to ensure that the evaluation instrument used meets the instructional strategies and objectives of the training tool used. During this project, I attempted to determine the effectiveness of two different training tools, a web-based tutorial and a simulation, using the same type of evaluation instrument. This evaluation may have been better conducted had different instruments been used that met the objectives of the various training tools.

Finally, I learned several lessons about designing a simulation. In teaching a complex system, I discovered that a simple design is generally preferable to something more complex. In designing the simulation as the content became more familiar, it became easy to ask the learner to make more complex decisions than were actually necessary to meet the learning goals. However, when presenting a learner with a new system with complex variables, a simple design generally meets the learning objectives

without becoming too overwhelming for the learner. In addition, a simulation of this complexity requires a considerable amount of guidance. Such guidance and feedback needs to either be implemented directly into the simulation itself, or by having an instructor or facilitator on hand throughout the process. A debriefing session was particularly useful for the learners to think reflectively, internalize what was taught, and share their ideas with other students. The lessons I have learned throughout this project I hope to implement in various projects in the future.

Schedule

The project was divided into several iterative phases of design and development, each with an associated deliverable. The design phase included the development of the design treatment of the training solution as outlined within a design strategy document. Within the tool development phase, the simulation engine was produced, and Deutsche Bank reviewed the simulation tool and authoring engine. In the scripting phase, scripts for the web-based training were designed, written, and reviewed. The media production phase included the development of all media for the animation and simulation, including graphics, audio recording, and Macromedia Flash web pages. In the integration phase, all revisions to the media were reviewed and confirmed, and the pilot test was completed. The final phase included the delivery of the final training course.

The timeline for this project was fairly closely adhered to, with the exception of the final revision cycle and delivery of the product. These changes resulted from scheduling conflicts on the Deutsch Bank side in terms of reviewing the product and conducting trial runs. Table 2 outlines the proposed timeline in comparison with the actual project schedule.

Table 2

Estimated and Actual Timeline

Tasks	Projected Date	Actual Date
Project Initiation	Fri 12/16/05	Fri 12/18/05
Audience Analysis	Fri 12/30/05	Fri 12/30/05
Design	Wed 1/25/06	Wed 1/25/06
Animation Script	Wed 2/01/06	Tue 2/14/06
Tool Development	Tue 3/14/06	Tue 3/14/06
Flash Development	Wed 3/15/06	Wed 3/15/06
Testing	Wed 4/05/06	Wed 4/26/06
Final Approval	Fri 4/07/06	Fri 4/28/06

Budget

Costs associated with this project were divided into four components: programming costs, project management costs, media costs, and instructional design costs. The following table breaks down the fixed pricing for each service and deliverable. The budget was adhered to, with the exception that the original project scope called for two instructional designers. However, in the initial phase of the project, the scope was cut to one instructional designer. Also, the project was designed to provide give and take between resources, costs, and phases of the project. This flexibility provided the opportunity to pull any excess budget from one phase of the project to cover any unexpected expenses in another phase. Also, any requested changes, revisions, or extensions of the project that were considered out of scope were assigned to a phase two

of the project for some time in the future. Table 3 describes the cost details of the

project.

Table 3

Projected and Actual Costs

Service/Deliverable	Projected Costs	Actual Costs
Project Initiation	$8,183.00	$8,183.00
Audience Analysis	$3,849.00	$3,849.00
Design	$9,885.00	$9,885.00
Script	$6,425.00	$6,425.00
Sim. Flash Development	$19,199.00	$19,199.00
Sim. Engine and Authoring Interface	$32,276.00	$32,276.00
Professional Audio	$700.00	$700.00
Testing	$8,726.00	$8,726.00
Final Approval	$1,698.00	$1,698.00
Total	$90,941.00	$90,941.00

References

Appleman, R. (1971). Designing experiential modes: A key focus for immersive

learning environments. *Tech Trends: Linking Research & Practice to Improve*

Learning, *49*, 64-74.

Armstrong, R.H.R., & Taylor, J. (1971). *Feedback on Instructional Simulation Systems.*

Cambridge Institute of Education.

Bonk, C., & Graham, C. (2006). *The Handbook of Blended Learning: Global*

Perspectives, Local Designs. San Francisco, California: Pfeiffer.

Cennamo, K. & Kalk, D. (2005). *Real World Instructional Design.* Belmont, California:

Wadsworth Publishing.

Driscoll, M.P. (2000). *Psychology of learning for instruction 2nd edition.* Needham

Heights: Allyn & Bacon.

Giguere, P. & Minotti, J. (2005). Rethinking Web-Based Learning. *T&D*, 59, 15-16.

Kirkpatrick, D. (1994). *Evaluating training programs: The four levels.* San Francisco,

California: Berrett-Koehler Publishers, Inc.

Kirkley, S., & Kirkley, J. (2005). Creating next generation blended learning

environments using mixed reality, video games and simulations. *TechTrends:*

Linking Research & Practice to Improve Learning, 49, 42-89.

Lainema, T., & Makkonen, P. (2003). Applying constructivist approach to

educational business games: Case REALGAME. *Simulation & Gaming*, *34*,

131-150.

Lewandowsky, S. (1993). The rewards and hazards of computer simulations.

Psychological Science, 4, 236-243.

Merrill, P., Hammons, K., Vincent, B., Reynolds, P., Christensen, L., & Tolman, M. (1996). *Computers in Education.* Needham Heights, Massachusetts: Allyn & Bacon.

Proulx, J. (2006). Constructivism: A re-equilibration and clarification of the concepts, and some potential implications for teaching and pedagogy. *Radical Pedagogy*, 8, 1.

Savery, J. & Duffy, T. M. (1996). Problem-based learning: An instructional model and its constructivist framework. *Constructivist Learning Environments: Case Studies in Instructional Design*, 135 - 148.

Simmons, M. (2002). *Securities Operations: A Guide to Trade and Position Management.* England: J. Wiley and Sons, Inc.

Soulier, J. S. (1988). *The Design and Development of Computer Based Instruction.* Newton, Massachusetts: Allyn & Bacon, Inc.

Sparrow, S. (2004). Blended is Better. *T&D*, 58, 52-55.

Thavkulwat, P. (2004). The architecture of computerized business gaming simulations. *Simulation & Gaming, 35*, 242-269.

Towne, D.M. (1995). *Learning and Instruction in Simulation Environments*. Englewood Cliffs: Educational Technology Publications, Inc.

Towne, D.M., De Jong, T., & Spada, H. (1993). *Simulation-Based Experiential Learning.* Germany: Springer-Verlag Berlin Heidelberg.

Zenger, J. & Uehlein, C. (2001). Why Blended Will Win. *T&D*, 55, 52-55.

Appendix A

Audience Analysis Learner Questionnaire

Questions for Participants
_____

We are developing a web-based course to introduce the importance of controls to Deutsche Bank employees. The course focuses on how the application of controls impacts errors, costs, and reputation risk. Your input will help us to create a course that will be interesting and applicable to you as a Deutsche Bank employee. To participate, you must complete this survey within 5 business days. We appreciate your help in creating this controls learning experience. Select your answers or type your answers into the text fields, and submit your survey by pressing the Submit button.

Demographics

1. How experienced are you with web-based training?

> Not Experienced (Never done any training by computer)

> Novice Experience (Used the computer once or twice for training)

> Intermediate Experience (Used the computer more then three times for training)

> Advanced Experience (Used the computer more than four times for training)

 2. How much experience do you have in investment banking operations?

> 1-6 months' experience with investment banking operations

> 6 months' to 1 year experience with investment banking operations

> 1–2 years of experience with investment banking operations

> 2 years plus experience with investment banking operations

3. What control training have you received? (Controls are 'Measures used to prevent or detect unintentional or intentional trade failures and losses associated with the management of assets.')

Personal Preferences

4. Whose advice would you trust to help you learn new concepts about your job?

    A coworker who has a little more experience

    A seasoned operations manager

    Someone else (please explain)

5. To what extent do you feel it is important for you to understand when/how controls are used? Please state your reasons.

Personal Experience

6. Are you currently aware whether controls are used in your area/section/department?

    Yes. I am aware that controls are used in my area/section/department. (Please summarize your understanding of why/how those controls are used.)

    No. I am not aware if controls are used in my area/section/department.

7. How would controls training help you in your position?

8. What do you know about independent validation as a control?

9. What do you know about the use of reconciliation as a control?

10. What is one thing you don't want to learn about controls?

11. What training have you had concerning the bond trade lifecycle?

12. What training have you had concerning money transfers?

13. In receiving training about controls, would you prefer to spend more time learning about the controls or practicing using them in a simulation environment? How would you divide the training?

    25% Learning about Controls / 75% Simulation

    50% Learning about Controls / 50% Simulation

75% Learning about Controls / 25% Simulation

Training Experiences

14. Describe your best training experience. What elements made it a great training? What kinds of activities were involved?

15. Describe the worst training experience you have had. What didn't you like about it?

16. What turns you off from training (if anything)?

Learning Preferences

17. How do you prefer to learn new material? (For example: reading, listening, reading and listening, interacting, etc.)

Appendix B

Field Trial Results from SME and instructor

Deutsche Bank Intro to Controls Pilot Feedback

Big Opportunities:
1. Substantially shorten the amount of time used to explain the Simulator. They found it easier to navigate than we had anticipated.

2. Re-design the Four Eyes section. This section received the most critical feedback. Eliminate student exercise. Consider showing one or two examples on the main screen. Analyze how to address 'this is too basic' and 'it is self explainable' feedback.

3. Create more structure around the Simulation section. They don't want to just play…they want more lessons and insights out of this component of the class.

4. Shorten the amount of time spent (or increase the pace) on the first two sections – Verification and Four Eyes.

5. Increase the pace of the class and shorten by an hour.

6. Re-work the technical deployment. Also – ensure that contingency procedures are easy to invoke. Have Mike practice this.

7. Clarify target population as minimum of six months' banking experience and maximum of 3 years.

8. Focus on marketing the class.

9. Have Mike experiment with different approaches to getting students to respond to questions.

10. Clarify HR point person by region.

Smaller, but noteworthy comments:
1. No need for a 'break-out' room

2. Room too tight.

3. Steve needs to fix Static Data – Receive Instruction Group

4. The drop down boxes on the Segregation control are too tedious to operate.

5. They liked the FOBO rec exercise.

6. Several students experienced data re-setting when they clicked start. Others were logged out several times.

7. One student had a 'Allowed/Not Allowed' box left on his screen that he could not remove.

8. Consensus that they would like to do class in seven hours or so.

9. Need to assemble the pre-class reading material for the Bond Purchase.

10. One or two students wanted more information on how segregation works in the simulator.

FYI (keep in mind as we design classes in future)
1. They like the exercise part of the video and want more. They also want more 'near miss' answers and more difficult exercises.

Noteworthy Feedback
1. Very positive feedback on mixture of learning methods/ variety of modules.

2. What will you remember about this class? Placing controls at effective points. More controls does not necessarily mean better. Putting controls in the right order. Questioning controls that are already in place and analyzing processes to ensure control.

3. What didn't you learn about controls that you wanted to? Do real world managers accept that there will be errors? How does this relate to people who do not work in a line? Want to discuss more about cost versus control trade-offs.

4. The 'Opportunity for Error', '6 Key Controls' and Simulator sections received the strongest positive feedback.

5. Liked the Instructor. His knowledge, his focus on them. 'He did not lecture at you,' and ' he kept our attention.'

6. Liked the Animations. Voice and speed was appropriate.

7. What improvements would you recommend? 'Questions directed specifically at individuals rather than to the group.'

8. Almost all believe they have the knowledge and authority to raise control issues and opportunities to their managers.

Appendix C

Field Trial Feedback from Learner Questionnaires

Feedback from pilot group

1. What 2-3 things have you learned from this program that will help you in your daily work?

Number of students	Feedback
1	How to implement a control infrastructure.
1	Various control tools to ensure quality of processes at work and factors that improve them.
1	Emphasis on four-eye policy, and my own attention was raised to reconciliation
1	3 types of 4-eyes, use of reconciliation, segregation as a control
1	Questioning controls that are already in place and analyzing processes to ensure no control is missing or whether the control can be improved.
1	Good controls benefit both parties. Good controls limit tangible and intangible loss to the bank. Fostering an environment where controls are part of everyday work increases effectiveness, competition, and possibly staff motivation.
1	Workplace culture
1	Different types of controls: hard, soft. Control incurs a cost
1	Segregation duty, where to place controls in department, and which to use
1	A better understanding of controls. How to balance controls and cost
1	Overview of trade flow, risk/cost/management
1	Each control had areas I could specifically relate to my daily activities and to those of my colleagues—will be discussed and, hopefully, some implemented
1	A better understanding of each of the 6 controls. The importance of a structured controls setup for each process. Cost versus errors ratio

Common feedback items: Better understanding of controls: control types, how and where to implement them, the cost/error ration of controls, questioning and analyzing processes to evaluate if a control is needed.

2. What improvements would you recommend for this program?

Number of students	Feedback
1	Tweak simulation so the data doesn't reset every time you click start
4	More explanation of various factors in the simulation that maximize effectiveness, rather than just playing until you get a good combination
1	More real-life scenarios
2	More group discussion

1	Handout wasn't clear
3	Program was too long and slow.
1	Questions directed specifically at individuals rather than the group.
1	4-eyes exercise (manual instructions) to be more specifically detailed
1	More targeted to staff working in the line
1	Drop 4-eyes test and the reconciliation test. Provide reading for the bond simulation
1	Simpler simulation program
1	Course would be more useful after 6 months' working experience instead of a year and a half
1	During simulation, it would have been useful to go over an example model at the end, to apply the real world model for those processes

Common feedback items: More explanation of various factors in the simulation that maximize effectiveness. More group discussion. Program pace was too slow.

3. My overall impression of this program was positive.

Feedback	Number of Students	Percentage
Strongly disagree		
Disagree		
Neutral	2	15.38%
Agree	6	46.15%
Strongly agree	5	38.46%
Total	13	

4. The program met its objectives.

Feedback	Number of Students	Percentage
Strongly disagree		
Disagree		
Neutral	1	7.69%
Agree	6	46.15%
Strongly agree	6	46.15%
Total	13	

5. A suitable combination of training approaches was used.

Feedback	Number of Students	Percentage
Strongly disagree		
Disagree		
Neutral		
Agree	8	61.53%
Strongly agree	5	38.46%
Total	13	

6. The content delivered was relevant and can be applied to my work.

Feedback	Number of Students	Percentage
Strongly disagree		
Disagree		
Neutral	1	7.69%
Agree	8	61.53%
Strongly agree	4	30.77%
Total	13	

Appendix D

Pilot Research Study Evaluation Form

Please answer the following questions after completing the web-based training animation. Please do not write your name on this form. When you are done with the quiz, go ahead and run the simulation and take the second quiz. Thanks for your participation!

1. Which of the following is NOT an example of a task?
   a. A trader executes a trade.
   b. A middle office employee enters the trade into the system.
   c. An operations employee double checks another employee's work.
   d. An operations employee settles the trade.

2. Which of the following is an example of a control?
   a. A trader executes a trade.
   b. A manager restricts system access privileges of a trader.
   c. An operations employee manually records the details of the trade.
   d. An operations employee settles the trade.

3. Which of the following are production costs? (select all that apply)
   a. Task costs
   b. Control costs
   c. Fail costs
   d. Reputation costs

4. Which of the following are error costs? (select all that apply)
   a. Fail costs
   b. Reputation costs
   c. Re-work costs
   d. Control costs

5. What functions do supervisors perform? (select all that apply)
   a. Ensure tasks and controls are performed
   b. Spot check work
   c. Execute trades
   d. Motivate the staff

6. What is segregation of duties?
   a. Restricts the tasks and controls an individual can participate in
   b. Encourages values and integrity of employees
   c. Validates identity and authority
   d. Ensures accuracy of data between two data sources

7. What is included in a corporate culture package?
   a. Hiring practices
   b. Corporate values programs
   c. Regulatory training
   d. All of the above

8. If a fax requesting a movement of funds is sent to the bank in error, which control will help detect the error?
   a. Segregation
   b. Supervision
   c. Verification
   d. Reconciliation

9. Which of the controls ensures accuracy of data between two data sources?
   a. Segregation
   b. Supervision
   c. Verification
   d. Reconciliation

10. Which of the following would a four-eyes control help prevent?
    a. Data entry error
    b. Error between two data sources
    c. A trader engaging in fraudulent activity
    d. Individuals claiming to be someone they are not

11. What is the impact of errors on costs?
    a. Increases
    b. Decreases
    c. Stays the same

12. What is the impact of controls on costs and errors?
    a. Increases costs, increases errors
    b. Increases costs, decreases errors
    c. Decreases costs, decreases errors
    d. Decreases costs, increases errors

13. What is the purpose of a money transfer?
    a. Exchange funds from one bank to another
    b. Pay a third party
    c. Purchase a bond
    d. All of the above

14. What did you like about this training?

15. What would you change about this training?