ROCKY MOUNTAIN
Alchemy
TURNING THE PLAIN
INTO THE PRECIOUS

DESIGNING ENGAGING SCENARIOS FOR ONLINE LEARNING EVENTS

VERSION 1.0

WHITE PAPER

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Introduction

This document

Scenarios are clearly one of most popular strategies employed in online learning, and are the heart of any story driven approach. This paper focuses on the critical elements to consider when designing story-driven and/or scenario-based learning. While the primary focus is online, discovery based learning events, the elements discussed would apply to video based instruction, as well.

The document is organized as follows:

- Types of scenarios
- Context issues underlying scenarios
- Components of goal based scenarios
- Glossary of relevant key terms
- Bibliography of key sources

Scenario Types

Introduction

Scenarios come in many shapes and sizes. The type of scenario you plan to design yields several design implications and considerations. This section defines the basic scenario categories or types.

Types of scenarios

The same set of categories used to classify simulations (Alessi and Trollip, 1985) can be applied to scenarios:

Category	Description
Physical	Displays a physical object on the screen, giving the learner an opportunity to manipulate it, use it, or learn about it. The emphasis is on the object itself, rather than on how to use it to support a procedure. Example: Instrument panel of a flight simulation
Procedural	Covers a sequence of actions that constitute a procedure. May be combined with a physical simulation interface to create a realistic environment for the procedure (e.g., landing an airplane). Examples: Diagnostics and trouble shooting, piloting a craft, landing an airplane In a typical procedural simulation, whenever the learner acts, the computer program reacts, providing information or feedback about the effects the action would have in the "real world." A procedural simulation provides the opportunity to explore different paths and their associated effects, allowing the learner to make inferences on what

Category	Description
	procedures are "better" than others.
Situational	Deals with the attitudes and behaviors of people in different situations, rather than with skilled performance. Allows the learner to explore effects of different approaches to a situation, or to play different roles in the situation. The learner typically takes a major role in the scenario (i.e., first person actor rather than third person observer). Examples: Interpersonal situations; workplace/HR topics such as sexual harassment, conflict management, diversity, etc.; role playing games.
Process	Allows the learner to set parameters at the beginning of the simulation, then watch the process occur without intervention. The learner may run the simulation numerous times using different parameters, then make inferences. Examples: SimCity, Roller Coaster Tycoon

Scenario Context

Introduction

Regardless of scenario type, each scenario/simulation has a context. The context is the physical entity, procedure, or situation the learner is a part of, or the process the learner is setting up and observing.

Contextual factors

Scenario context consists of the following factors, which determine the scenario's nature and the nature of the interactions within it (Alessi and Trollip, 1985):

Factor	Description
Learner point of view	• First person actor – Learner is an actor/reactor in the scenario. – Learner makes decisions and responds to the changing scene as it develops. • Third person observer – Learner is observing the scenario/phenomenon from within the scene (e.g., an employee in the room who is not involved with the scene) or from outside the scene (e.g., invisible camera, fly on the wall). – Learner may have control over an actor in the scenario (e.g., "what should the manager do next?") or simply make observations about the scene (e.g., "what did the manager do wrong?").
Time frame	Relationship the context has to real time of the phenomenon being represented. • Accelerated – The actual phenomenon of

Factor	Description
	developing a civilization takes hundreds of years; in SimCity, the learner can develop a civilization in less than an hour. • Real time • Decelerated • Combination – A conflict management scenario may include interactions in real time, then "jump ahead" in time (accelerated) to the next interaction.
Objects	Any physical entities, pictured or described (including people).
Precision	How well what is being simulated is understood. A chemical experiment can have great precision because there are fixed laws governing actions and reactions; a human interaction will have lower precision because human actions and reactions are too complex to program reliably.
Level of realism	Whether the simulation occurs in the real world. A scenario with the learner as a manager handling a sexual harassment complaint could have a high level of realism; a scenario with the learner as a fantasy character who must answer the Sphinx's riddle in order to enter the pyramid would have a low level of realism. *(There are valuable applications for both types of scenarios, but motivation and transfer of learning are increased when the scenario has a higher level of realism.)*
Relationship to instructional goals	How closely does the context match the learning goals (objectives)?

Factor	Description
	• Intrinsic: The context is directly related to what is to be learned. • Related: The context is only associated with the goals. • Arbitrary: There is no relationship to the objectives.
Sequence	What is the order of events within the context? • Linear • Cyclic • Complex – When the complexity of the real world model is too high, it may be simplified for the learning event to make the simulation easier to design and program, and to better facilitate learning. *(Most procedural scenarios will be linear or cyclic, while most situational scenarios will have a complex sequence.)*
Number of solutions	Some simulations will have no correct or incorrect answer; others may have only one correct solution; others may have multiple correct solutions (some solutions may still be "better" than others). The number of solutions will impact the navigation structure and feedback used throughout the scenario.

Scenario Components

Scenario components

According to Schank, Berman, and Macpherson (1999), there is only one effective way to teach someone how to perform a task; let them do it. In the online learning environment, this is accomplished using goal-based scenarios (GBS). Their list of goal based scenario components appears in the table below along with a description of the component:

GBS Component	Description
Goals	Goals will fall into one of two categories: • Content • Process
Mission	In order to appropriately engage the learner, the mission must be: • Motivational • Somewhat realistic – Again, more realistic scenarios result in increased motivation and transfer of learning.
Cover story	Background story line must: • Create the need for the mission • Allow enough opportunities to practice the skills and seek the knowledge • Be engaging and motivating
Role	The role the learner will "play" must be: • One who uses the skills and knowledge to be learned • Motivating
Scenario operations	Activities or interactions the learner performs must: • Be closely related to both the mission and the goals

GBS Component	Description

	• Have decision points with consequences that become evident
	  – The consequences must indicate progress toward completing the mission.
	  – A negative consequence must be understood as failure.
	• Contain enough action/decision points to allow the learner to practice applying the knowledge and/or skills
	• Fit the objective
	  – The tasks the learner is asked to perform should not require more knowledge and/or skills than what the objective(s) entails.

Resources	The available resources must provide the information the learners need to succeed in the mission. The following guidelines apply to the design and delivery of resources: • The information must be well organized and readily accessible. • The information should be provided within the context of the story as much as feasible. – This aids in indexing and encoding of information into long term memory. • The learner should be able to easily relate to the story, and should understand how the resources apply.
Feedback	Feedback is typically provided using one or more of the following techniques: • Show/discuss consequence of actions.

GBS Component	Description
	• Provide coaching and/or additional instruction. • Relate the knowledge and/or skill to the real world through expert performer's stories about similar experiences. The following guidelines apply to the design and delivery of feedback: • Feedback should clearly identify success or failure so it is properly indexed by the learner. • Feedback should be immediate ("just in time") so the learner can use it.

The Schank, Berman, and Macpherson components focus on the goal based scenarios that would be a part of the learning experience rather than the entire learning experience.

Glossary

Terms

The following definitions are available for quick reference:

Term	Definition
Discovery based learning	An approach to instruction through which students interact with their environment by exploring and manipulating objects, wrestling with questions and controversies, or performing experiments" (Ormrod, 1995).
Scenario based learning	A learning event designed to engage the learner in a world of scenarios rather than a set of instructional screens. The learner discovers and applies the new knowledge and/or skills through interactions, progressing the scenarios.
Story driven learning	Using a master storyline woven throughout the training, as opposed to individual and separate scenarios.
Transfer of learning	Application of new learning on the job.

Bibliography

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