Adaptive Learning

You will use the questions, objectives, exams, and content objects to implement adaptive learning through the SuccessFactors Learning system.

OBJECTIVES

Upon completion of this lesson, you will be able to:

♦ Define adaptive learning
♦ Create objectives
♦ Tie questions to objectives
♦ Tie objectives to content objects
♦ Build exam objects using objectives (question pooling)

MAIN CONCEPTS OF ADAPTIVE LEARNING

Adaptive learning in SuccessFactors Learning refers to instruction that adapts to the needs and traits of the user. It involves an objective-based teaching and testing process. Users’ exam performance can dynamically generate unique online content for remediation purposes.

An online item can be designed to begin with a “pre-test,” which is an assessment of a user’s knowledge of each learning objective before taking the course. Then, based on the results of the pre-test, the system only presents to the user content within the item that is associated with the learning objectives for which they failed to make a specified score on the pre-test.
Also, you can include a final exam that the user must pass in order to receive credit for the item. The final exam tests the user on every learning objective that was originally designed in the online course content, regardless of the user's performance on the pre-test (Figure 1).

![Figure 1. Adaptive Learning](image)

In order to employ this strategy, follow these steps:

1. Ensure the objectives are linked to both a content object and to questions.
2. Create a new exam object.
3. Select to include any objectives (questions), as appropriate and necessary, specifying the minimum and maximum number of questions per objective, and the total number of questions on the exam as desired.
4. Check the **Analyze the exam results** checkbox and set flags for passed objectives for both the **On Passing** and **On Failure** conditions.
BASIC CONCEPTS FOR WORKING WITH OBJECTIVES IN QE

A learning objective is a set of words, pictures, and/or diagrams that let others know what you intend for your users to achieve upon completion of a specified section of instruction. Objectives are related to learning outcomes and are designed to be specific and measurable.

If you want the online course to provide for delivery and remediation at an objective level, then the objectives must be linked directly to the online content. Questions can be associated with the learning objectives that have been created. These associations can be useful in tracking which objectives have been attempted and/or successfully mastered by your users. Associating objectives with questions creates question pools. Exams that draw from a pool of questions are more randomized.

Objectives Support Adaptive Learning

Objectives provide a way for the system to identify user learning needs, based on exam results:

1. Define a content object with desired objectives.
2. Configure an exam with questions that test these objectives.
3. Add the content object and the exam object to an item.
4. Set up the item so objective status matches exam results:
   - If user passes the objectives associated with a content object, the status of the content object is set to Complete.
   - If user fails the objectives associated with a content object, the content object is Incomplete.

Adaptive tests use the objective as a connection between content objects and test questions in an item. If a user passes an
objective, he/she also passes the content object. By passing the content object, the user can avoid reviewing it (in the case of a post-test) or avoid taking the content object completely (in the case of a pre-test).

**Objectives Support Question Pools**

Objectives can be used to generate a pool of question variants available for an exam. Consider the following scenario:

You associated objective ABC with five questions:

<table>
<thead>
<tr>
<th>Question</th>
<th>Variant</th>
<th>Question Stem</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>1</td>
<td>The Earth has this many oceans...</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Which of the following is not an ocean?</td>
</tr>
<tr>
<td>102</td>
<td>1</td>
<td>How many continents are there?</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>There are ____________ continents.</td>
</tr>
<tr>
<td>103</td>
<td>1</td>
<td>China is on the continent...</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Asia includes which country?</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>China is not on the continent of Asia. (true/false)</td>
</tr>
<tr>
<td>104</td>
<td>1</td>
<td>How many continents are on the western hemisphere?</td>
</tr>
<tr>
<td>105</td>
<td>1</td>
<td>Is a continent a body of water or land?</td>
</tr>
</tbody>
</table>

You define rules for the system to use when selecting questions, such as:

- Question 105, variant 1 must always appear in the exam
- System should select a minimum of 3 and maximum of 5 questions
Figure 2 shows how the objective-based questions display in two exam iterations.

![Exam A]
1. Is a continent a body of water or land?
2. The Earth has this many oceans…
3. There are _____ continents.

![Exam B]
1. China is on the continent:
2. Is a continent a body of water or land?
3. The western hemisphere has how many continents?
4. Which of the following is not an ocean?
5. Continents on Asia include:

Figure 2. Two Iterations of an Objective-Based Exam

ASSOCIATING AN OBJECTIVE WITH A QUESTION

Questions can have an associated objective. Objectives define the knowledge users should achieve through training; the questions test users’ knowledge to determine whether the objectives for the training are achieved. There are two ways admins can associate objectives with questions:

♦ Create the objective first, and then associate it to the questions
♦ Create a new objective while editing a question

Creating an Objective and Associating with a Question

To create an objective and then associate that objective to a question:
1. Navigate to Content > Objectives.
The *Objective Search* screen displays (Figure 3).

![Figure 3. Objective Search Screen](image1)

2. **Click Add New.**

The *Add New Objectives* screen displays (Figure 4).

![Figure 4. Add New Objective Screen](image2)

3. **Enter all the required and optional information as appropriate.**

4. **Click the Online checkbox.**

*Note: When you check this checkbox, users can access content objects and exams that incorporate this objective. If the box is not checked, users are locked out of any online material that incorporates the objective.*
5. Click **Add**.

The objective is added and saved and you are taken to the Summary tab of the objective record (Figure 5).

![Figure 5. Summary Tab of Objective Record](image)

If you click the Questions tab, you are only able to view the questions associated with this objective. To associate this objective to a question, you must associate via the question record:

1. **Navigate to Content > Questions.**
2. **Search for the question and access the record in edit mode.**
3. **Expand the Objective Information section (Figure 6).**

![Figure 6. Objective Information Section of Question](image)

4. **Click the select objective icon (_finder).**
Note: You can also use the Actions menu on the right to associate and add objectives to the question (Figure 7).

Figure 7. Actions Menu to Associate Existing Objective

5. Enter search criteria in the **Objective ID Search** pop-up window.

6. Click **Search**.

Your search results are displayed (Figure 8).

Figure 8. Objectives Search Results

7. Click the **Select** link next to the objective you want to associate with the question.

The objective ID is automatically entered into the textbox in the Objective Information section.

8. Click **Associate**.
The objective is associated with the question (Figure 9).

![Objective Information](image)

Figure 9. Objective Associated with Question

9. Click Save to save your changes.

**Creating New Objectives While Editing a Question**

To create a new objective while editing a question:

1. Navigate to **Content > Questions**.

2. Search for the question and access the record in edit mode.

3. Expand the **Objective Information** section of the screen (Figure 10).

![Objective Information Section](image)

Figure 10. Objective Information Section

4. Click **Add New** in the Add New Objective section.

*Note: You can also select **Add New Objective and Associate** from the Actions drop-down menu.*
The *Add New Objective and Associate* pop-up window displays (Figure 11).

5. Enter the required information: objective name, description, and domain.

6. Check the **Online** checkbox.

7. Click **Add**.
The new objective is added (Figure 12).

![Objective Information]

Figure 12. New Objective is Added

8. Click Save.

Once you have associated an objective to the question, the options in the Actions menu change. You are now able to change or remove the objective associated with the question (Figure 13).

![Actions]

Figure 13. Actions Menu for Objectives
Lab 1.  Associating an Objective with a Question

Step

1. Log in to the admin interface of SuccessFactors Learning.

2. Navigate to Content > Questions.


4. Access the question in edit mode.

5. Expand the Objective Information section of the screen.

6. Click the select objective icon (Q).

7. Enter search criteria in the Objective Search pop-up window.

8. Click Search.

9. Click the select link next to the objective you want to associate with the question.

10. The objective ID is automatically entered into the textbox in the Objective Information section.

11. Click Associate.

12. Click Save.

Job Aid: Question Editor
ASSOCIATING AN OBJECTIVE WITH A CONTENT OBJECT

Before the adaptive learning model can be implemented, the association between the objective and a content object must be established. This relationship is made in the content object record (Figure 14).

Figure 14. Content Objects Record: Objectives Tab

Best practice is to associate one objective per content object. That way, when a user fails to achieve a high enough score on a particular section of an exam, it ties back to one piece of content.
Lab 2. Add an Objective to a Content Object

Step
1. Navigate to Content > Content Objects.
2. Add a new content object and point it to a piece of online content.
3. Select the Objectives tab.
4. Click the add one or more from list link.
5. Search for and select the objective to add to the content object.
6. Verify that the selected objective is displayed on the Objectives tab.
7. Add the content object to an existing online item.
**QUESTION POOLING/RANDOMIZATION**

Question pooling/randomization occurs when an exam is created by the assignment of questions through objectives. As a rule, the smaller the difference between the number of available questions and the minimum questions assigned to be used, the lesser the degree of randomness.

For example, if an exam is defined to include 10 questions, and the available number of questions (based on the objectives that have been assigned) is 20; that makes a pool of 10 questions available for use in the exam.

- Available = 20 in the pool
- Minimum = 10 total to be used in exam

If you specify the same value for minimum questions to be used as the value for available questions, randomness is eliminated.

- Available = 10 in pool
- Minimum = 10 total to be used in exam

You also set the number of points associated with each objective. For example, if you set the points = 50 and there are 10 questions, each question is worth 5 points. If you set a range for the number of questions to be asked per objective, the points are distributed equally amongst each question presented to the user.

Objective Points = 50

- a. 5 questions presented, each question = 10 points
- b. 7 questions presented, each question = 7.14 points
- c. 10 questions presented, each question = 5 points
When creating an exam using objectives, if you check the Analyze the exam results checkbox, the other check boxes in the Edit Exam Analysis module are activated (Figure 15).

![Figure 15. Analyze Exam Options](image)

This is where you define how the exam behaves after it is scored. The check boxes in the On Passing and On Failure sections specify what happens when a user has either passed or failed the exam.
Lab 3. Creating an Adaptive Exam

Step

1. Create objectives to describe the knowledge you want users to possess.

2. Associate the objectives with content objects that teach the knowledge described in the objectives.

3. Create a learning item to contain the content:
   a. Add the content to the item on the Online Content tab of the item record.
   b. Determine the settings you want to use:
      - **Record learning event when all content is complete**: Select this checkbox if you want the item to be automatically marked as complete when all content and exam objects that compose the item are marked as complete.
      - **AICC and SCORM: Allow users to review content from Completed Work**: This checkbox enables the review of online content for AICC and SCORM items. The content can be accessed and launched from the Learning History (Completed Work) but will not yield a completion value. It sets the AICC and SCORM parser to “Review Mode”.

4. Create questions that test a user’s mastery of the objective and assign the objective to the questions.

5. Follow the steps to create a simple online exam.

   **Note**: The exam cannot be a survey.

6. Set the passing percentage.
Note: Users must answer this percentage of questions correctly to receive a flag for the objective. Optionally, you can also hard-select questions, but if you do, be sure to understand the interaction between questions included by objective and hard-selected questions. The interaction has implications on scoring.

7. Click the Analyze Exam Results checkbox.

8. Set the On Passing and On Failure options:

   a. Set flags for passed objectives: When you select this check box, the user receives credit for passing objectives. For passed objectives, Needs Review flags are cleared, and Complete flags are set. Users can pass specific objectives that are listed on the Objectives tab of the exam and fail the overall exam.

   b. Clear flags for failed objectives: When you select this check box, the user loses credit for failing objectives in the exam, even if he or she had previously passed the objective.

   c. Clear all objective flags: Applicable only when user has failed overall exam. When you select this check box, the Needs Review flag is set and the Complete flag is removed for every objective associated with the exam. The user loses credit for completing all objectives that are represented by questions on the exam, even if he or she passed the objective. The user’s curriculum status is only affected for the item in which this exam appears.

9. Click the Questions tab of the exam object record.

10. Enter search criteria to search for the question.

11. Click Search.

12. Click the checkbox to the left of the objective to add the objective.

13. Click Select.
14. Click the number under the **Available** column for the objective.

15. Set the minimum and maximum number for questions to include on any exam.

16. If necessary, change the **Pass** and **Points** values.

17. Click **Save**.

18. Click the **Summary** tab.

19. Check the **Is Active** and **Is Online** checkboxes.

20. Click **Apply Changes**.

21. Create a new item and associate the content (that have the associated objectives used in the exam) and exam objects.

22. Assign the item to a user.

23. Login as the user and complete the exam.

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*Job Aid: Online Exams*
CONCLUSION

In this lesson, you learned how to create objectives and associate questions to the objective. You also learned how to tie objectives to content objects, build exams using objectives, and how the adaptive learning process works in the SuccessFactors Learning system.

You should now be able to:

♦ Define adaptive learning
♦ Create objectives
♦ Tie questions to objectives
♦ Tie objectives to content object
♦ Build exam objects using objectives (question pooling)
**LESSON CHECK**

Use what you learned in this lesson to answer the following questions.

1. True or false:
   A question can be tied to more than one objective.

2. True or false:
   An objective can be tied to more than one content object.

3. Which of the following can you not do when a user fails an exam and adaptive learning has been established:
   a) Clear the flags for all failed objectives
   b) Set the completion flags for all passed objectives
   c) Lock the exam
   d) Remove the item from the Learning Plan (To-Do List)