

Data Frameworks

User Guide

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OVERVIEW

Data frameworks are an extension to Realizeit to allow the collection and analysis of data in the system. They provide opportunities to gather data from learners at various points throughout a course. They can either be deployed on a learning node or be triggered by a learner doing something in the system – for example, opening a course, completing a lesson, or answering a question. This flexibility allows clients to enable surveys in a huge variety of scenarios.

The purpose of this document is to introduce Realizeit customers to the feature, and to outline use cases that can be employed or adapted by customers to create their own data frameworks.

Examples and use cases

- An institution might want to run a survey at the end of a course to gather information about user satisfaction. Data frameworks can be used to present questions to be asked on completion of the course.
- An institution might be interested in collecting affective data about the learner, for example how they are feeling at particular points in the learning process.
- Realizeit may apply data gathered using data frameworks to influence the learner profile; for example, to find out whether learners self-regulate their learning, and what techniques they use to do so.

It is important to note that responses to data frameworks do not contribute to the evidence about the learner's ability; data frameworks exist in parallel to learning. They may be used to investigate learner attitudes, or how the learner works, but they do not impact the system's beliefs about how much the learner has learned.

COURSE DEVELOPER

Course developers configure all aspects of data frameworks, including what kind of data is captured, when it's captured, how the data capture instance is displayed to responders, and in what part of the system the data is captured. The choices to be made in this configuration depend on the use case being employed, as will be discussed later in this document.

The three entities that control the main functionality related to this data capture procedure are *data types*, *data items* and *data frameworks*:

- **Data frameworks:** A data framework is a collection of pieces of data that should be captured along with rules that indicate when the pieces of data should be captured.
- **Data items:** A data item is a piece of data that can be captured using a data framework; it can be captured more than once using a data framework.
- **Data type:** A data type is the fundamental building block for a data item – it defines the nature of the data to be captured.

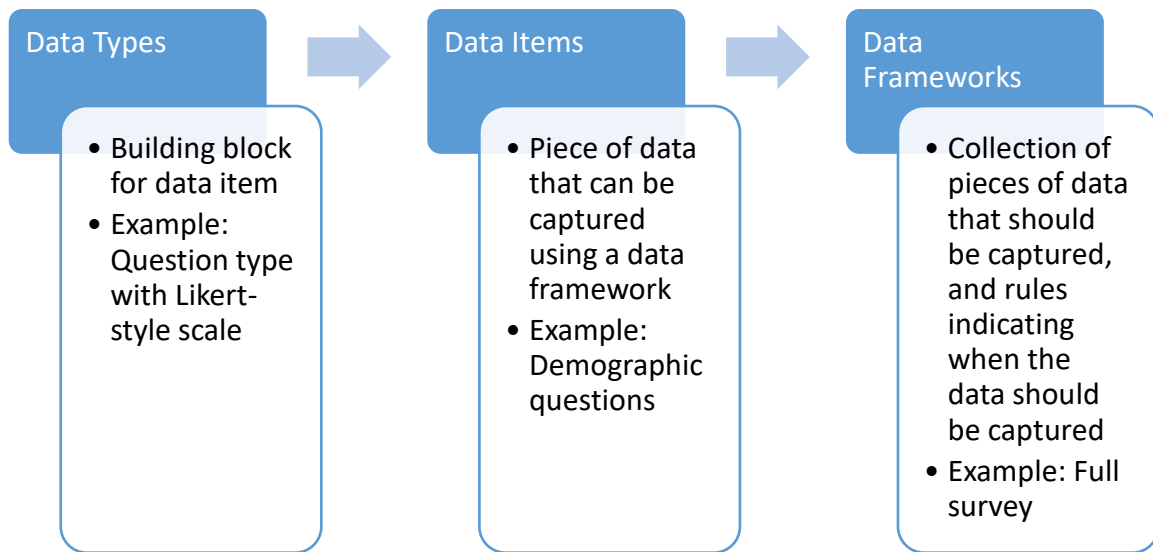


Figure 1 This chart indicates the relationships between Data Types, Data Items, and Data Frameworks

CREATING A DATA FRAMEWORK

Data frameworks can be created from the **Data frameworks** page, which can be selected from the **More** menu. On the **Data frameworks** page, the course developer should select the **Create a new data framework** link. This opens the data framework definition, from which all aspects of the data framework can be defined.

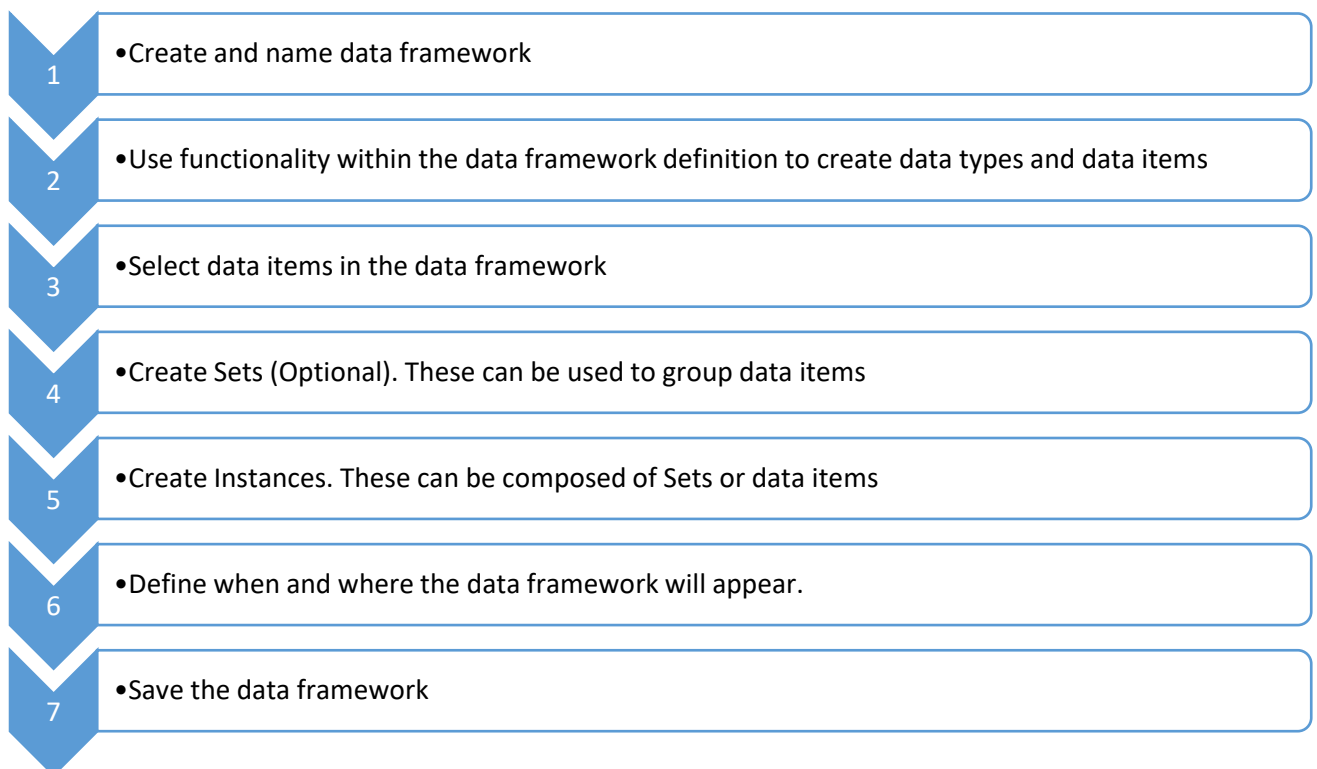


Figure 2 High-level process for creating a functional data framework

As discussed in the previous section, data types and data items must be created for a functional data framework to be populated. However, the functionality for creating data types and data frameworks is accessible from within the data framework definition. Figure 2 outlines in brief the necessary steps for creating a functional data framework from within the data framework definition.

Once a data framework has been created it must be given a name. The following sections outline the other steps that define important aspects such as what the data framework asks, where it is triggered, and when it is triggered.

Selecting data items in data framework

Data frameworks can only be used to capture data from learners if data items have been selected in the **Data items** section of a data framework definition (shown in Figure 3).



The screenshot shows a web interface for defining data items. At the top, there is a header 'Data items' and a sub-header 'You can identify the data items that will be used within this data framework.' Below this is a table with the following structure:

Order	Data item	Label	Var name	Question HTML
1	None			

There is a '+' button at the bottom left of the table to add new data items.

Figure 3 Data items must be selected in the **Data items** area of the data framework definition

To select a data item from the **Data items** section of a data framework definition, follow these steps:

1. Select the **add data item** link.
2. From the **Data item** field, select an already defined data item. If an appropriate data item has not been created yet, select the + button beside the **Data item** field and, from the dialogue that appears, create a new data item. Steps for creating a data item are outlined in the *Creating a data item* section of this document.
3. Entering a label is not a necessary step but can be helpful if a data item is to be re-used in this data framework, as the use of a label will distinguish this case of the data item from any other cases where the same data item is used.
4. Question HTML can be defined at different times:
 - When the data item is created.
 - When the data item is selected in the data framework.

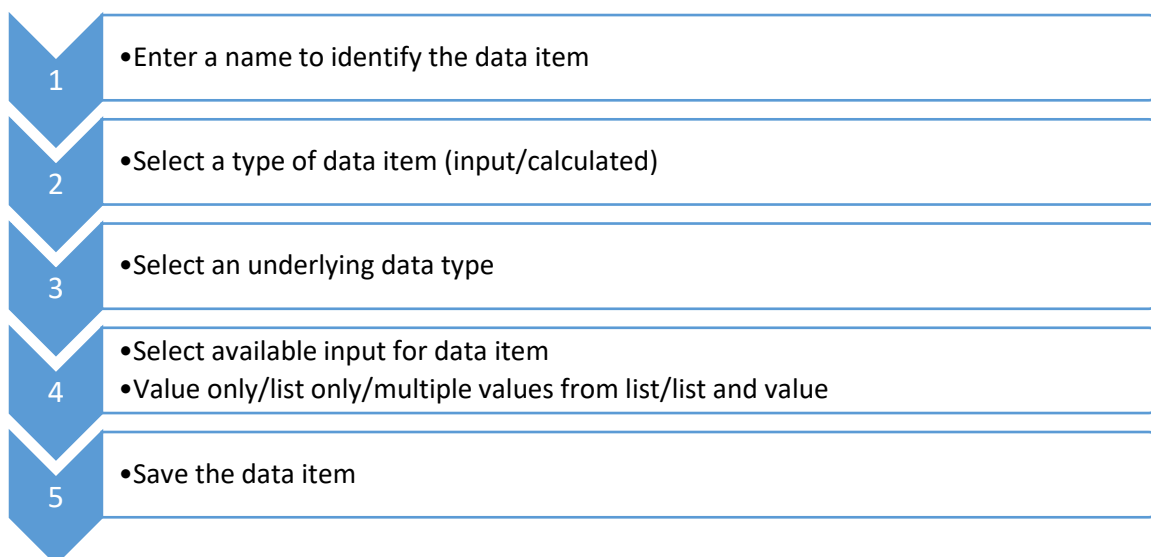
If question HTML was defined in the data item when the data item was created, it is not necessary to add text in the **Question HTML** field for the data item selected in the data framework. If no other question HTML is defined, it should be defined in the **Question HTML** field for each data item selected in the data framework. If text is added here (for the data item in the data framework definition) it will override any text defined in the data item definition.

Note: It will usually be preferable to add question HTML in the data framework rather than in the data item, because this allows the data item to be used more flexibly (i.e. multiple times in the same data framework, or in multiple data frameworks).

Creating a data item

A data item is a piece of data that can be captured using a data framework. It can be captured more than once using a single Data framework. Data types function as building blocks for data items, with the data type selected for the data item defining what type of data is captured.

A new data item can be created from either the **Data items** page, or during the creation of a data framework. The most important aspects of this process are outlined in Figure 4.



*Figure 4 Important steps for creating a new data item from either the **Data items** page or a data framework*

Data items can be created either by selecting the **Create a new data item** button (+) within a data framework, or by navigating to the **Data items** page and selecting the **Create a new data item** button from there. The only necessary component that must be added for a new data item to be saved is a name. Since data items can be selected repeatedly in data frameworks, users should make sure that the data item they want to use has not already been created, to avoid duplication.

For a data item to be used in a data framework, an underlying data type must be selected. Data types can be selected either from the **Data types** page or during the creation of a data framework, while a data item is being created. Steps outlining the creation of data types can be found in the Creating data types section of this document.

Selecting the relevant input for a data item from the **What should be available for input for this data item?** field determines the type of data that will be captured. For a text box, **Value only** should be selected. For a set of radio buttons, **List only** should be selected. For a set of checkboxes, **Multiple values from list** should be selected. If **List and value** is selected, radio buttons will be shown, plus an empty text box that will be filled by the numeric value that maps to the user's radio button choice.

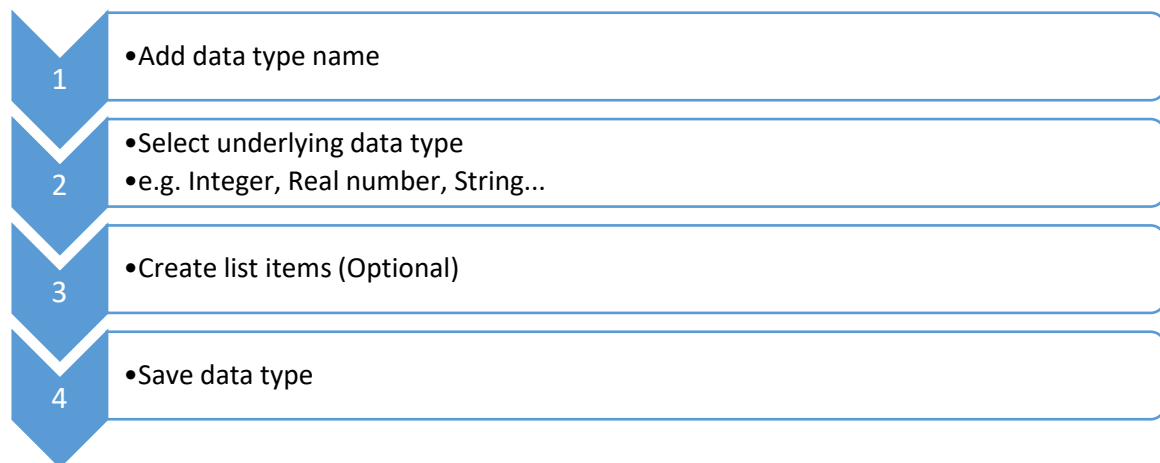
Creating data types

A data type defines the nature of a piece of data that will be captured. This could be a text box, a Likert-type scale, or checkboxes, among other types of data capture. Data types can be created on the **Data types** page, or during the creation of a data framework. They must then be selected as

building blocks for data items during the creation of data items. Since data types can be reused as building blocks for multiple data items, users should make sure that another data type with the same features has not already been created, to avoid unnecessarily duplicating work.

Creating a new data type

A new data type can be created from either the **Data types** page, or during the creation of a data framework. The most important aspects of this process are outlined in Figure 5. Steps for creating specific sample data types are outlined in the Sample data types section of this document.



*Figure 5 Important steps for creating a new data type from either the **Data types** page or a data framework*

Sample data types

Data types can be created either by selecting the **Create a new data type** button (+) within a data framework, or by navigating to the **Data types** page and selecting the **Create a new data type button** from there. The only necessary component that must be added for a new data type to be saved is a name. The following subsections outline the creation of commonly used data types that are likely to prove useful in data frameworks.

Data type for Likert-type scale

A responder could be required to provide a judgement in degrees, such as how much they agreed or disagreed with a statement. To set up a data type like this, follow these steps:

1. Enter a name for the data type.
2. Select **Integer** as the underlying data type.
3. Create the number of list items that are needed for the questions that will be asked, using this data type as a building block. For example, if the responder will be asked to indicate their level of agreement with a set of statements on a five-point scale, create five list items.

An example of such a scale is:

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

4. Give each list item a name using the **Name** field for each list item. These names will be displayed to the responder.
5. In the **Value** field for each list item, enter a numeric value – for example, for **Strongly agree** enter 5, for **Somewhat agree** enter 4, for **Neither agree nor disagree** enter 3, for **Somewhat disagree** enter 2, and for **Strongly disagree** enter 1.
6. Select **Save**.

In this case, if a data item using this data type is deployed in a data framework, the responder will be presented with radio buttons or checkboxes (this is defined in the associated data item), and the text in the **Name** field for each list item is shown with each button or checkbox. The value selected is linked to the numeric value entered in the **Value** field for each list item, which is stored by the system.

Numeric value

A responder to a survey could be asked to provide a single numeric response – for example, if they were to be asked to provide their age, or a percentage, or any other simple numeric value. To set up a data type like this, follow these steps:

1. Enter a name for the data type.
2. Select a numeric underlying data type, such as **Integer**, **Real number**, **Percentage (Integer)** or **Percentage (Real number)**, depending on what kind of data is to be captured.
3. If desired, enter a minimum and maximum numeric value.
4. If using a data type of **Real number** or **Percentage (Real number)**, and if desired, specify the number of decimal places to use for display.
5. Select the **Save** button.

In this case, if a data item using this data type is deployed in a data framework, the responder will be presented with a text box in which they can enter a numeric value.

Open-ended comment

A responder could be asked to provide an open-ended comment on their experience of a learning course. In this case, a text-based underlying data type (such as **Short string (Phrase)**, **String (Sentence)**, or **Long text (Paragraph)**) should be used. These data types all allow the same amount of text to be entered, but the size of the textbox presented to the user varies. To set up a data type like this, follow these steps:

1. Enter a name for the data type.
2. Select a text-based data type as the underlying data type.
3. Select **Save**.

In this case, if a data item using this data type is deployed in a data framework, the responder will be presented with a text box in which they can enter text.

Creating Sets in a Data Framework (Optional)

Sets allow data items to be grouped together, both within the data framework, and as the data framework is presented to the responder. Sets are not a necessary component of a data framework but using them can make both setup and presentation of the data framework easier.

The **Display condition** field for a Set allows for a KAL condition to be defined, which can, for example, cause a set to appear if and only if a certain response or subset of responses is selected. For example, if a comment-type question is to appear if and only if the response to another question is 'Strongly disagree' or 'Somewhat disagree', follow these steps:

1. In the data framework, create a data item for the triggering question. This should reference a data type from Strongly disagree (mapped to a value of 1) to Strongly agree (mapped to a value of 5).
2. Create a data item for the comment-type question, referencing a text-type data type.
3. Create a set for the triggering question, referencing the relevant data type, and including a value in the **Var name** field for this data item (e.g. 'agreement1').
4. Create a set for the question that is to be triggered conditionally.
5. In the **Display condition** for the question to be triggered conditionally, define a KAL condition that will cause the question to appear if and only if 'Strongly disagree' or 'Somewhat disagree' is chosen, e.g. `agreement1==1 or agreement1==2`.
6. Reference both created sets in new **Instances**.
7. Save and deploy the data framework.

Example use case: If a survey on course satisfaction contained five demographic questions, and ten questions to measure course satisfaction, a set could be created for the demographic questions, and another set for the course satisfaction questions. The demographic questions would be delivered together (perhaps at the beginning of the survey), and the course satisfaction questions would be delivered together.

Creating Instances in a Data Framework (Required)

Instances, which can be composed of either individual data items, or Sets of data items, must be defined for the data framework to deliver opportunities for data capture to the responder. Instances are created from the **Instances** section of the data framework definition. The following section demonstrates how some sample instances can be configured.

Defining When and Where Data Should Be Captured

Each instance can be defined to appear in a different part of the system. Two fields primarily define when and where data will be captured, and both are used when an instance is being defined – the **Type** field and the **When** field.

Type field

If **Activity (directly)** is selected in the **Type** field, the data framework will be used on a data framework node, and this data framework will become available for selection on nodes with the activity of **Data framework**. The other options available from the **Type** field are areas in the system where a data framework will be triggered when the condition set in the **When** field are met.

When field

There are four options available from this field:

- When instance is first created/identified
- When instance is complete

- When created/identified then again after interval
- When created/identified then repeat every interval

These options are only relevant if an option other than **Activity (directly)** is selected for the **Type** field. Examples of how these options could be used are outlined below.

When instance is first created/identified

If a survey is to be delivered the first time a learner selects a product (e.g. a demographics survey), this option should be selected along with the **Product** option from the **Type** field. When a learner opens the product for the first time the survey will be delivered.

When instance is complete

If a survey is to be delivered when a learner finishes their course (e.g. a course satisfaction survey), this option should be selected along with the **Product** option from the **Type** field.

When created/identified then again after interval

If a survey is to be delivered when a learner starts their course, and then again a week later, this option should be selected along with the **Product** option from the **Type** field. The interval is defined using the **Interval (days)** field in the instance, and to have the instance appear again a week later, the number seven should be entered here.

When created/identified then repeat every interval

This is the same as the previous option, but with the interval to repeat. Again, the interval is defined using the **Interval (days)** field. The **Max intervals** field can also be used to ensure that the instance does not deliver beyond a certain number of intervals.

SELECTING WHERE A DATA FRAMEWORK SHOULD APPEAR

Data frameworks can be configured to appear in two basic scenarios:

- **On a Data Framework Node:** These are hierarchy nodes that have an activity defined as **Data Framework**, and that have had a data framework attached. The responder selects a link indicating **Complete survey** to view and complete the data framework. Individual and aggregate results of these surveys can be made available to instructors. **Example:** Once a learner completes an activity during their course, instructors might want to learn how learners reacted to that activity, and what they took from it. A survey on the next node after that activity could be used for this purpose.
- **Elsewhere in Realizeit:** Data frameworks can be defined to appear in various system areas (e.g. Product, Lesson, Section, Question, etc.) when the learner first interacts with the area, when they complete the area, or after an interval of either first interacting with or completing the area. The data framework must be selected on the product for this to be effective. **Example:** When a learner finishes a course, they could encounter a survey designed to measure their satisfaction with the course.

ADDING A DATA FRAMEWORK ON A NODE

If a data framework has been made available for selection on a node, it will be available for selection on any node that has been designated as a data framework node. For the data framework to be available for selection on a node, an **Instance** must be created with a **Type of Activity (directly)**, as discussed in the previous section. To select a data framework on a node, take the following steps:

1. From a hierarchy view, select the curriculum node.
2. From the **Details** panel, select the **Activity** field and select **Data framework**.
3. From the **Data framework** field, select a data framework.
4. Select **Save**.

The **Activity** field and **Data framework** field on the **Details** panel can be seen in Figure 6.

The screenshot shows the 'Details' panel for 'Lesson 1'. The panel has a title bar with 'Details' and two icons. Below the title bar is a section for 'Lesson 1'. The main area contains several sections: 'Content' with icons for edit, download, share, and a plus sign; 'Graph' with icons for add, connect, disconnect, and search; 'Additional information (0)' and 'Attributes (0)' both with expandable arrows. Below these are several fields: 'Activity' (set to 'Data framework', highlighted with a red box), 'Cat 1' (set to '<none>'), 'Cat 2' (set to '<none>'), 'Process' (set to 'Not part of process'), 'Assessment' (set to '<none>'), 'Variation applies' (set to 'No'), 'Verification applies' (set to 'Yes'), 'Est time' (empty), and 'Est time (Verify)' (empty). At the bottom, the 'Data framework' field is set to '<none>' and is highlighted with a red box.

Figure 6 Main details panel for a node that will have a data framework selected on it

ADDING A DATA FRAMEWORK TO A PRODUCT

If the data framework is to appear in an area of the system other than on a node, the data framework must be added to the relevant product. This can be done by following these steps:

1. Edit the relevant product.

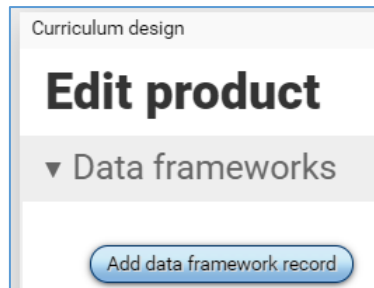


Figure 7 By selecting the **Data frameworks** subsection while editing a product, a course developer can add a data framework if the data framework is to appear in a system area other than on a node

2. From the **Data frameworks** section of the product, select the **Add data framework record** button, as in Figure 7.
3. Select the relevant data framework and save the record.
4. Save the product.

PREVIEWING A DATA FRAMEWORK

Data frameworks can be previewed from the **Data frameworks** page. A **Preview** button appears alongside each data framework if at least one instance has been defined for the data framework. Selecting this button results in a preview of the data framework being displayed.

LEARNER EXPERIENCE

Learners will encounter data frameworks as surveys to be completed in Realizeit. There are two general categories of encounters which learners will have with data frameworks:

- i. In a Data Framework Node
- ii. In other parts of the system

LEARNER EXPERIENCE OF DATA FRAMEWORK NODES

Data framework nodes have had their activity defined as **Data Framework** and have had a data framework attached. Learners can encounter them on the objective landing page (see Figure 8) and on the learning map (see Figure 9).

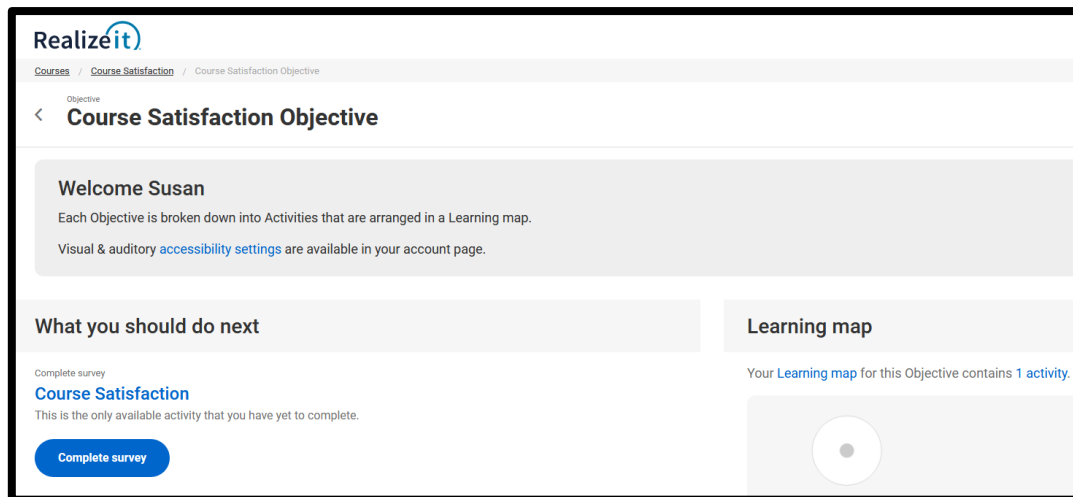


Figure 8 Learner view of landing page for an objective with the option to complete a survey on a Data Framework Node from the **What you should do next** area

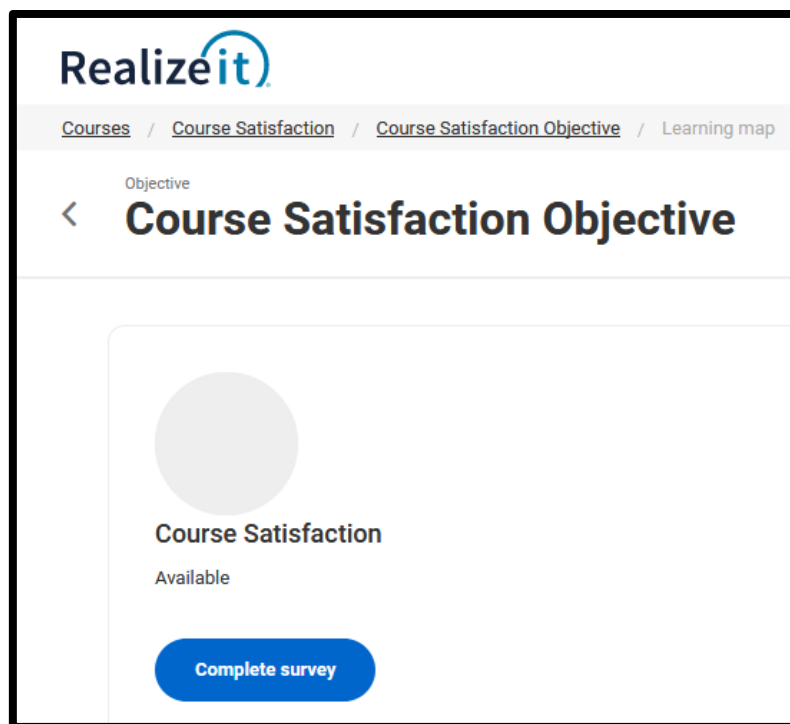


Figure 9 Learner view of learning map with a Data Framework Node, and the option to complete a survey using the **Complete survey** button

If learners select the **Complete survey** button, and if the data framework has been defined to have text appear in a popup before the presentation of the data framework, this popup will appear before the data framework is presented, as in Figure 10.

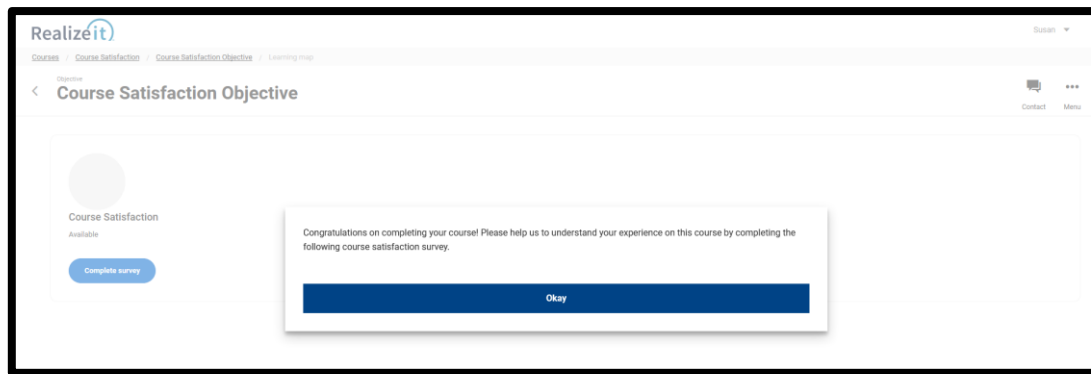


Figure 10 Learner view of a popup appearing prior to the presentation of a data framework

Figure 11 shows a data framework being answered by a learner.

 The screenshot displays the 'Course Satisfaction' survey form. It begins with a title 'Course Satisfaction' and an introductory paragraph: 'Now that you have completed your course, please take this opportunity to provide feedback. Your responses will help us to provide a better course in future.' Below this, a grey box contains the instruction: 'Please indicate how much you agree with the following statements on the scale provided'. The survey consists of three statements, each with a five-point Likert scale:

- Statement 1: 'This course met my expectations.' with options: Strongly agree, Somewhat agree, Neither agree nor disagree, Somewhat disagree, Strongly disagree.
- Statement 2: 'The instructor was always prepared.' with options: Strongly disagree, Somewhat disagree, Neither agree nor disagree, Somewhat agree, Strongly agree.
- Statement 3: 'The instructor responded to my queries in a timely fashion.' with options: Strongly disagree, Somewhat disagree, Neither agree nor disagree, Somewhat agree, Strongly agree.

Figure 11 Example of the learner view of a data framework being presented

Figure 12 shows the objective landing page after a data framework node has been completed, and Figure 13 shows the learning map after a data framework node has been completed.

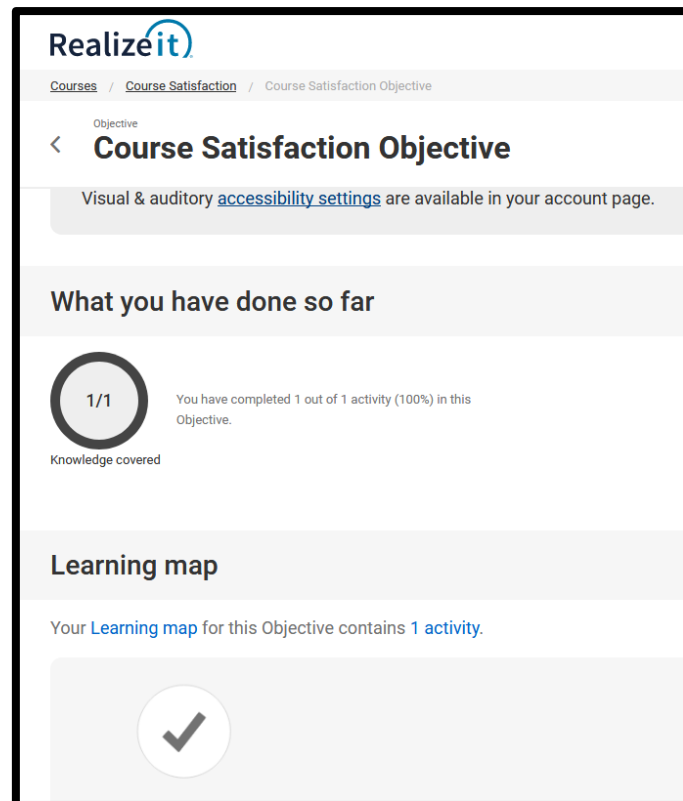


Figure 12 Objective landing page once data framework node has been completed

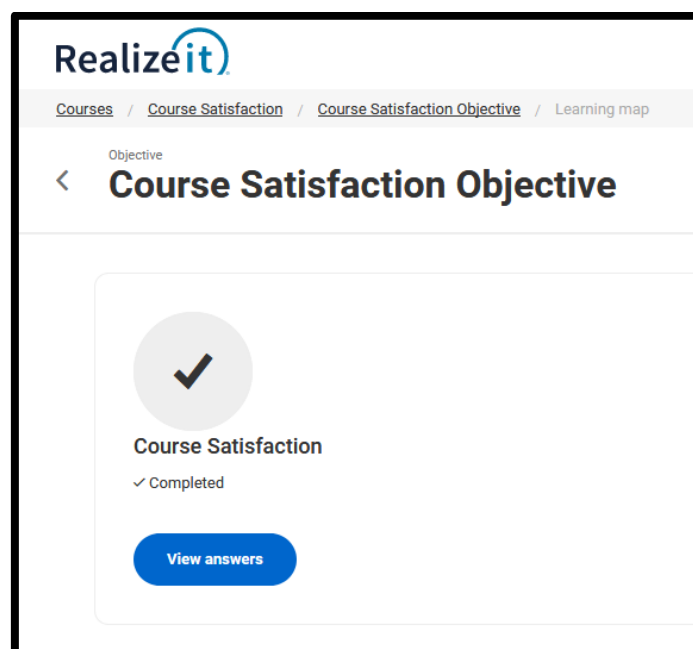


Figure 13 Learner view of a completed data framework node, and the option to view the answers they gave on the survey

Figure 14 shows the data framework (with editable responses) as it appears to the learner once the **View answers** button has been selected. If a data framework has been configured *not* to have editable responses, selecting **View answers** will simply display the responses.

Course Satisfaction

Now that you have completed your course, please take this opportunity to provide feedback. Your responses will help us to provide a better course in future.

Please indicate how much you agree with the following statements on the scale provided

This course met my expectations.

☐ Strongly disagree
 ☐ Somewhat disagree
 ☐ Neither agree nor disagree
 ☒ Somewhat agree
 ☐ Strongly agree

The instructor was always prepared.

☐ Strongly agree
 ☐ Somewhat agree
 ☒ Neither agree nor disagree
 ☐ Somewhat disagree
 ☐ Strongly disagree

The instructor responded to my queries in a timely fashion.

☐ Strongly agree
 ☐ Somewhat agree
 ☐ Neither agree nor disagree
 ☒ Somewhat disagree
 ☐ Strongly disagree

Figure 14 Learner view of a data framework that has already been responded to (if responses are configured to be editable after submission)

LEARNER EXPERIENCE OF DATA FRAMEWORKS IN OTHER PARTS OF REALIZEIT

Data frameworks can be triggered in a variety of other areas of the system apart from on a node. In these cases, a learner’s action – for example, opening a product, finishing a lesson, answering a question, etc. – can trigger the presentation of a data framework. The areas that a data framework can appear in, the frequency it can appear with, and the actions that trigger its appearance, are defined from the **Instances** section of a data framework definition, and the exact variety of options available are defined in detail in the **Data Frameworks Functional Specification** document.

INSTRUCTOR EXPERIENCE

Instructors can view learner data from data frameworks that are presented as part of a data framework node if one of two checkboxes have been selected by the course developer in the data framework definition. From the **More advanced details** section, the following checkboxes are available to the course developer:

- **Instructor can view individual responses**
- **Instructor can view aggregate responses**

If both checkboxes are selected, the instructor will be able to access both individual and aggregate responses by selecting the data framework node from the **Learning map** tab for the objective. If both checkboxes are selected, and some learners have completed the data framework, the **Main details** tab for the data framework node will display as in Figure 15, with a **Survey results** button for aggregate results, and a **Survey** link beside each name in the **Completed learners** list to access individual results. If only one checkbox is selected, then only the button relating to that checkbox will display to the instructor.

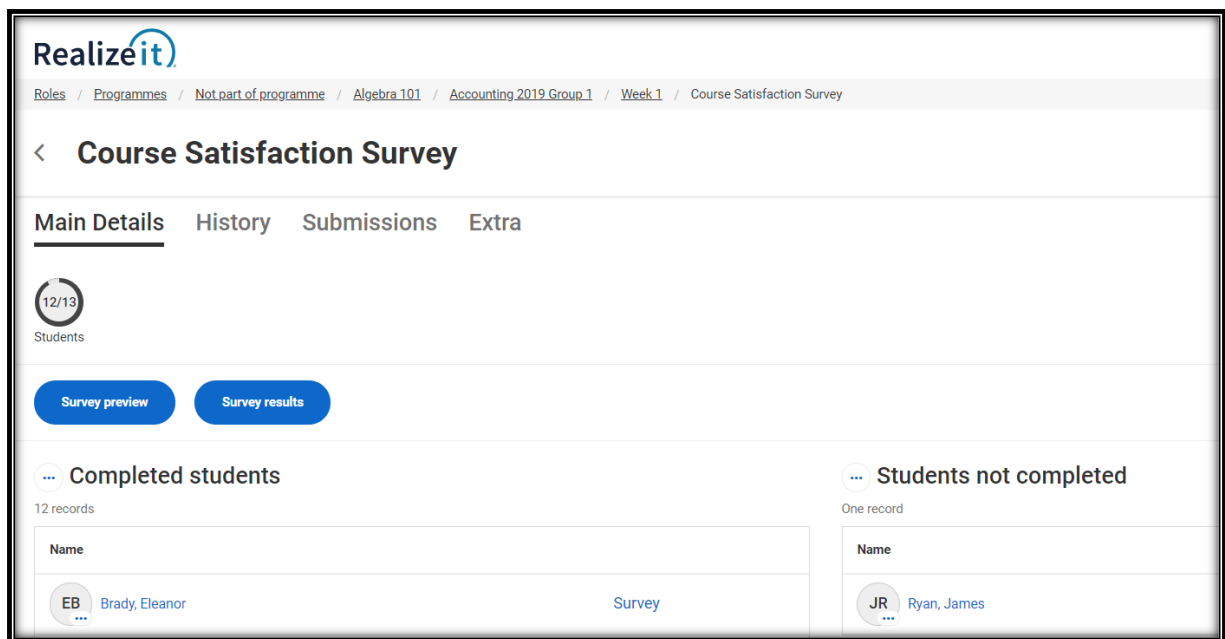


Figure 15 **Main details** tab of data framework node with both aggregate and individual data framework results available to the instructor

When an instructor selects the **Survey** link for an individual learner, they see the survey with answers defined, as in Figure 16.

Course Satisfaction

Susan Ryan

Now that you have completed your course, please take this opportunity to provide feedback. Your responses will help us to provide a better course in future.

Please indicate how much you agree with the following statements on the scale provided

This course met my expectations.
4: Somewhat agree

The instructor was always prepared.
3: Neither agree nor disagree

The instructor responded to my queries in a timely fashion.
2: Somewhat disagree

I was able to manage the material.
5: Strongly agree

Figure 16 Example of data framework from Data Framework Node as responded to by individual and viewed by instructor

When an instructor selects the **Survey results** button to view aggregate results, they are delivered to the **Survey results** page for the data framework node (as seen in Figure 17). From here, the instructor can display aggregate responses, or display and download these responses.

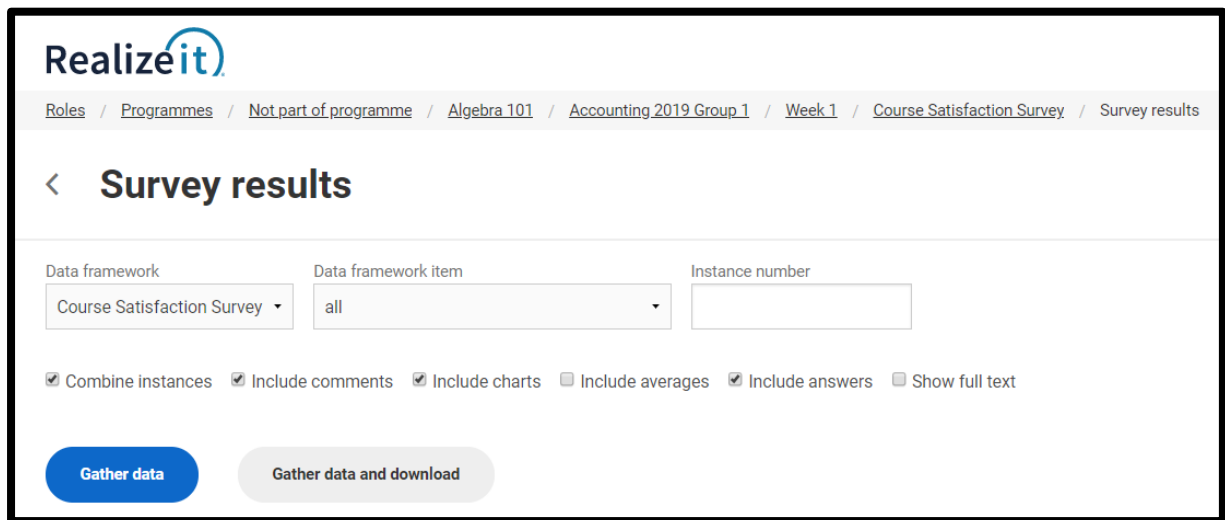


Figure 17 **Survey results** page for a data framework on a node, as viewed by an instructor

Instructors cannot access results of data frameworks presented in other areas of the system apart from in Data Framework Nodes.

COURSE ADMINISTRATOR EXPERIENCE

Users with the Course Administrator role have access to aggregate results for data frameworks presented in system areas other than Data Framework Nodes. They have no access to individual results for data frameworks, and they have no access to results for Data Framework Nodes. To access the results for a data framework specified on a product, the course administrator should open the product page and select the **Data Captured** link, as in Figure 18.

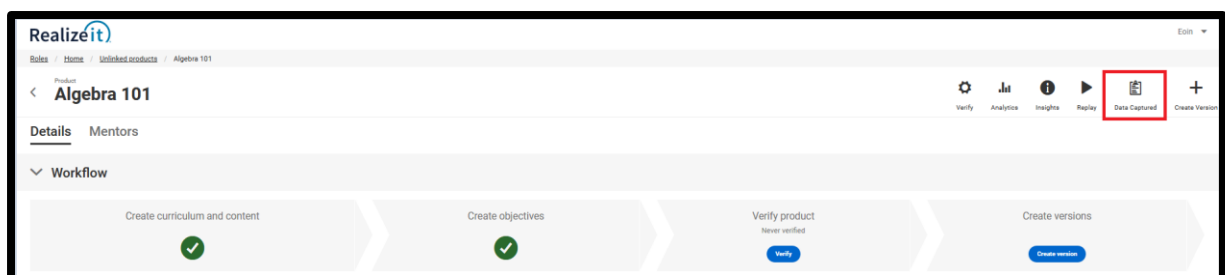


Figure 18 Course administrator view of a product with **Data captured** link highlighted

From the **Data captured** page (as in Figure 19), the course administrator can filter the results as required.

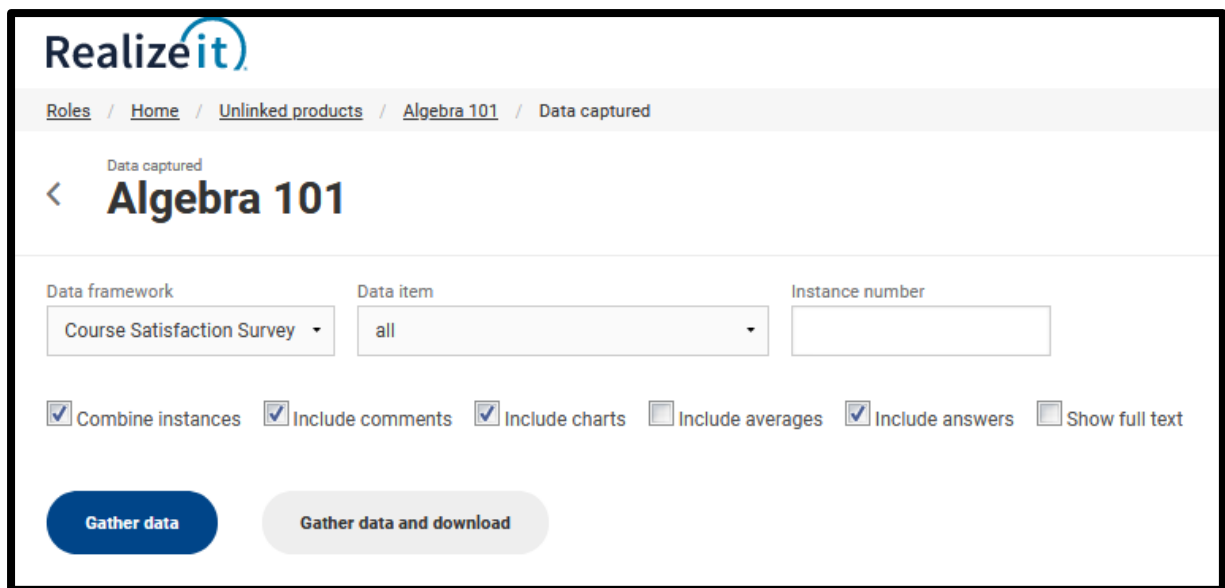


Figure 19 *Data captured* area

TRAINER EXPERIENCE

The trainer has access to the same level of data as the instructor for data frameworks completed on a node. If a Data Framework node has been created, and if the settings to allow instructors to view individual or aggregate data have been selected on the data framework, the trainer can have access to either individual data framework results, or to aggregate data, or to both. As with instructors, trainers do not have access to results of data frameworks the learner answered in other parts of the system (i.e. in areas other than on data framework nodes).

VIEWING INDIVIDUAL AND AGGREGATE DATA FOR DATA FRAMEWORKS AS TRAINER

If a training session has been created, and trainees in the training session have completed a data framework, the trainer can access the results, depending on whether the data framework has been configured to allow the instructor to access either individual or aggregate results.

If the **Instructor can view individual responses** checkbox is selected in the data framework definition, the trainer will be able to view individual responses by selecting the **Survey** button from an individual learner's display tile on the **Overview** tab of the data framework node, as in Figure 20. If the **Instructor can view aggregate responses** checkbox is selected in the data framework definition, and if more than one student has completed the survey, the trainer will be able to view aggregate responses by selecting the **Survey results** button from the **Overview** tab of a data framework node, as in Figure 21.

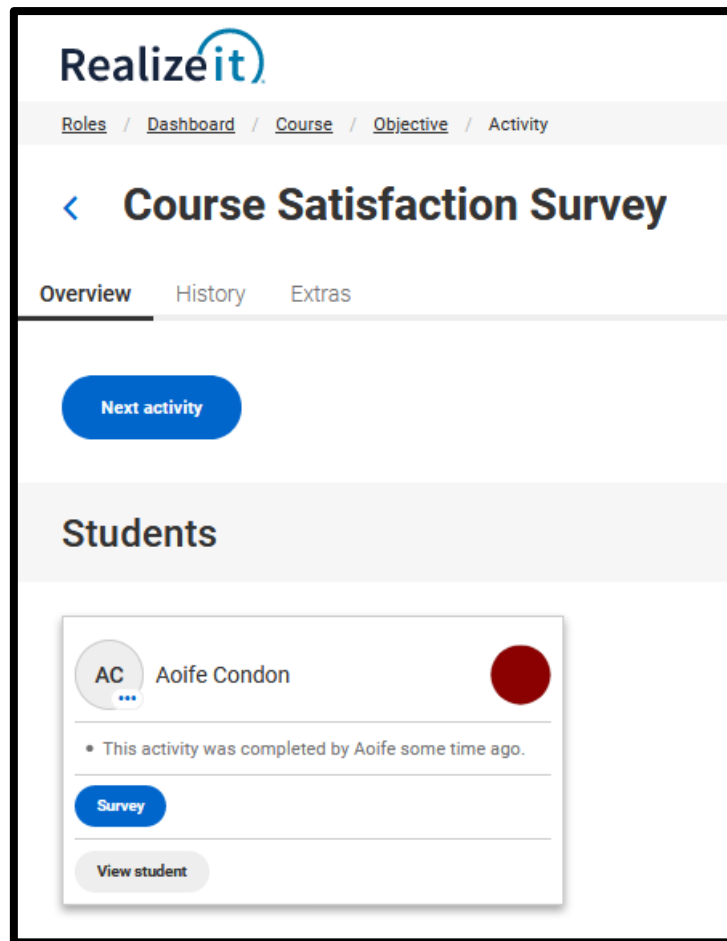


Figure 20 A data framework node displaying in the Trainer UI with a learner having completed the data framework. Results for the individual can be accessed from the **Survey** button on their display tile.

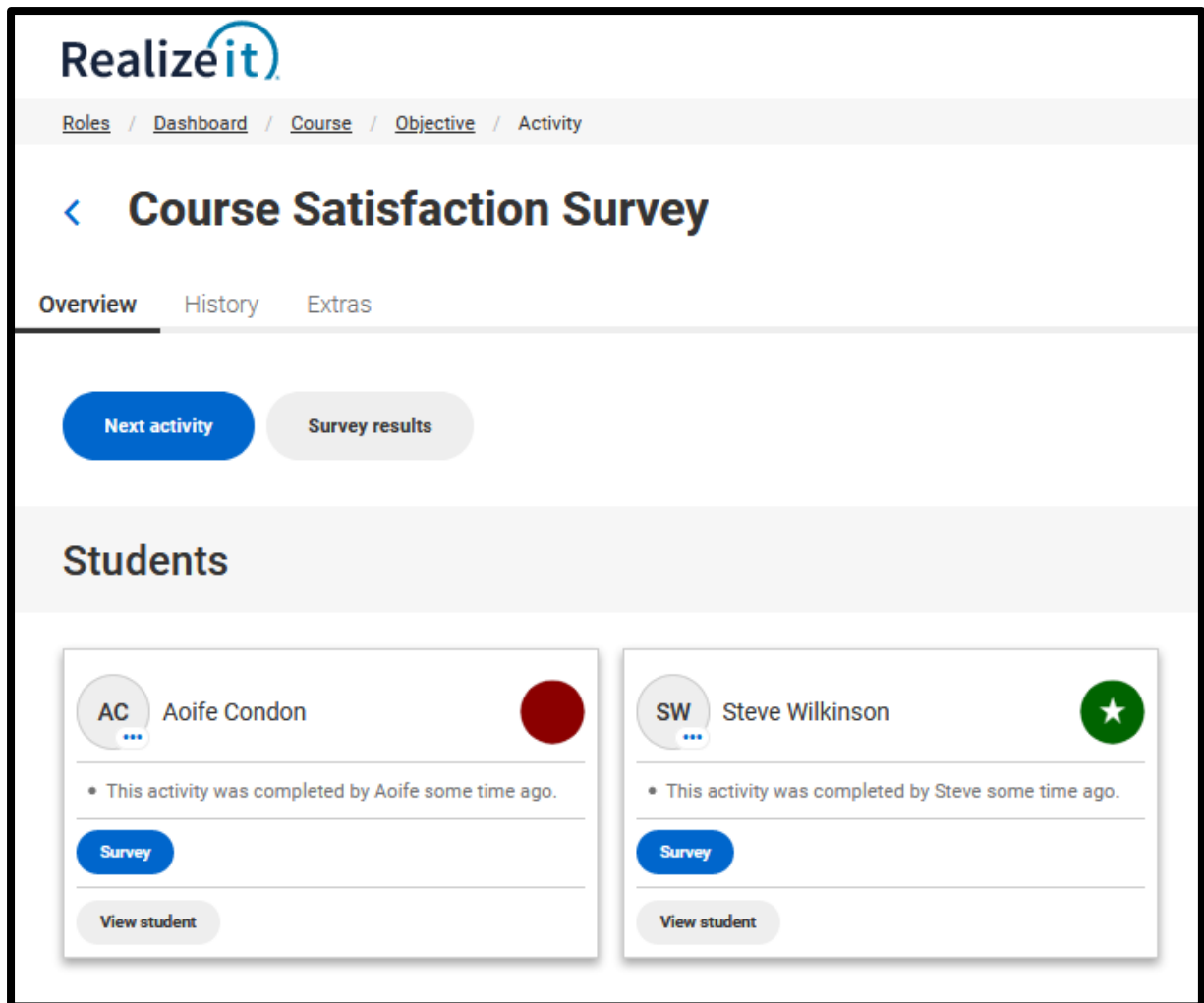


Figure 21 A data framework node displaying in the Trainer UI with more than one learner having completed the data framework node. Aggregate results are available from the **Survey results** button, while individual results are available from the **Survey** button for each individual on their display tiles.