

# Use xAPI to Measure & Evaluate Learning Effectiveness

Reporting Goal	KPI / Measure	Purpose	Feedback Loop(s)	Reports/ Analytics	Assessment Technique	Key xAPI Data
Pretest Pass Rate	Number of users that passed a knowledge assessment pretest	Measures the users' existing knowledge before completing a learning activity	<ul style="list-style-type: none"> <li>- Informs stakeholders of users' existing knowledge of subject matter</li> <li>- Informs stakeholders of users' performance above or below the passing score threshold</li> <li>- Provides benchmark for later comparison against the posttest results</li> </ul>	Pretest Pass/Fail Rate Report, Scorecard, or Dashboard	Pretest Knowledge Assessment	<ul style="list-style-type: none"> <li>- <b>Initialized Assessment</b></li> <li>- actor</li> <li>- verb.id (<a href="#">initialized</a>)</li> <li>- object.id</li> <li>- object.definition.type (<a href="#">assessment</a>)</li> <li>- timestamp</li> </ul>
Practice Test Pass Rate	Number of users that passed or failed a knowledge assessment quiz or practice test	Measures the users' new knowledge acquired during a learning activity	<ul style="list-style-type: none"> <li>- Informs stakeholders of users' increased knowledge</li> <li>- Informs stakeholders of high and low performers, above or below the passing score threshold</li> <li>- Provides a metric for comparing against the pretest results</li> </ul>	<ul style="list-style-type: none"> <li>- Posttest Pass/Fail Rate Report, Scorecard, or Dashboard</li> <li>- Pretest/Posttest Comparison Report, Scorecard, or Dashboard</li> </ul>	Practice/Quiz Knowledge Assessment	<ul style="list-style-type: none"> <li>- <b>Terminated Assessment</b></li> <li>- actor</li> <li>- verb.id (<a href="#">terminated</a>)</li> <li>- object.id</li> <li>- object.definition.type (<a href="#">assessment</a>)</li> <li>- context.registration</li> <li>- result.duration</li> <li>- result.success</li> <li>- result.completion</li> <li>- result.score.scaled</li> <li>- result.score.raw</li> <li>- timestamp</li> </ul>
Posttest Pass Rate	Number of users that passed or failed a knowledge assessment posttest	Measures the users' increase in knowledge after completing the learning activity	<ul style="list-style-type: none"> <li>- Informs stakeholders of users' increased knowledge</li> <li>- Informs stakeholders of high and low performers, above or below the passing score threshold</li> <li>- Provides a metric for comparing against the pretest results</li> </ul>	<ul style="list-style-type: none"> <li>- Posttest Pass/Fail Rate Report, Scorecard, or Dashboard</li> <li>- Pretest/Posttest Comparison Report, Scorecard, or Dashboard</li> </ul>	Posttest Knowledge Assessment	<ul style="list-style-type: none"> <li>- <b>Responded to Question</b></li> <li>- actor</li> <li>- verb.id (<a href="#">responded</a> or <a href="#">answered</a>)</li> <li>- object.id</li> <li>- object.definition.type (<a href="#">cmi:interaction</a>)</li> <li>- object.definition.interactionType (<a href="#">possible values</a>)</li> <li>- context.registration</li> <li>- context.contextActivities.parent (array that includes the assessment Activity)</li> <li>- context.contextActivities.parent (object.definition.type (<a href="#">assessment</a>))</li> <li>- result.duration</li> <li>- result.success</li> <li>- result.completion</li> <li>- result.score.scaled</li> <li>- result.score.raw</li> <li>- timestamp</li> </ul>
Refresher Pass Rate	Number of users that passed or failed a refresher knowledge assessment	Measures retention and knowledge decay after completing the refresher learning activity	<ul style="list-style-type: none"> <li>- Informs stakeholders of users' knowledge retention or decrease in knowledge</li> <li>- Informs and monitors users' performance above or below the passing score threshold</li> <li>- Provides a metric for comparison against previous assessment results</li> </ul>	<ul style="list-style-type: none"> <li>- Refresher Pass/Fail Rate Report, Scorecard, or Dashboard</li> <li>- Posttest/Refresher Comparison Report, Scorecard, or Dashboard</li> </ul>	Refresher Knowledge Assessment	<ul style="list-style-type: none"> <li>- actor</li> <li>- verb.id (<a href="#">responded</a> or <a href="#">answered</a>)</li> <li>- object.id</li> <li>- object.definition.type (<a href="#">cmi:interaction</a>)</li> <li>- object.definition.interactionType (<a href="#">possible values</a>)</li> <li>- context.registration</li> <li>- context.contextActivities.parent (array that includes the assessment Activity)</li> <li>- context.contextActivities.parent (object.definition.type (<a href="#">assessment</a>))</li> <li>- result.duration</li> <li>- result.success</li> <li>- result.completion</li> <li>- result.score.scaled</li> <li>- result.score.raw</li> <li>- timestamp</li> </ul>
Attempts Made Before Passing	Number of attempts users made before they passed the knowledge assessment	Measures when a user's first successful attempt on an assessment meets or exceeds the threshold score	<ul style="list-style-type: none"> <li>- Informs stakeholders of a user's knowledge attainment speed</li> <li>- Informs stakeholders of potential improvements to the quality of the learning activity</li> <li>- Informs stakeholders to check for users that keep attempting the assessment until they pass (or exceed the limit)</li> </ul>	<ul style="list-style-type: none"> <li>- First Attempt Pass Rate Report, Scorecard, or Dashboard</li> <li>- Time to Knowledge Attainment Report, Scorecard, or Dashboard</li> </ul>	Knowledge Assessment	<ul style="list-style-type: none"> <li>- context.registration</li> <li>- context.contextActivities.parent (array that includes the assessment Activity)</li> <li>- context.contextActivities.parent (object.definition.type (<a href="#">assessment</a>))</li> <li>- result.duration</li> <li>- result.success</li> <li>- result.completion</li> <li>- result.score.scaled</li> <li>- result.score.raw</li> <li>- timestamp</li> </ul>
≥ 80% Combined Average Passing Score	Average (mean) score of all users that passed or failed a knowledge assessment	Measures the average of all users' scores to be represented as the standard mean score	<ul style="list-style-type: none"> <li>- Provides stakeholders with a benchmark to compare user's individual scores to the standard mean score</li> <li>- Provides stakeholders with a benchmark to compare the standard mean score to the threshold score</li> </ul>	Average Score Report, Scorecard, or Dashboard	Knowledge Assessment	<ul style="list-style-type: none"> <li>- context.registration</li> <li>- context.contextActivities.parent (array that includes the assessment Activity)</li> <li>- context.contextActivities.parent (object.definition.type (<a href="#">assessment</a>))</li> <li>- result.duration</li> <li>- result.success</li> <li>- result.completion</li> <li>- result.score.scaled</li> <li>- result.score.raw</li> <li>- timestamp</li> </ul>
≥ 80% First Attempt Average Passing Score	Average (mean) score of all users that passed a knowledge assessment on the first attempt	Measures the average of all users' scores that passed on the first attempt to be represented as the standard first attempt passing mean score	<ul style="list-style-type: none"> <li>- Provides stakeholders with a benchmark metric to compare the standard mean score to the standard first attempt passing mean score</li> <li>- Provides stakeholders with a benchmark metric to compare the standard first attempt passing mean score to the threshold score</li> </ul>	<ul style="list-style-type: none"> <li>- First-Time Average Score Report, Scorecard, or Dashboard</li> </ul>	Knowledge Assessment	<ul style="list-style-type: none"> <li>- context.registration</li> <li>- context.contextActivities.parent (array that includes the assessment Activity)</li> <li>- context.contextActivities.parent (object.definition.type (<a href="#">assessment</a>))</li> <li>- result.duration</li> <li>- result.success</li> <li>- result.completion</li> <li>- result.score.scaled</li> <li>- result.score.raw</li> <li>- timestamp</li> </ul>
Two Standard Deviations Above or Below the Average	Standard deviation (SD) from the average score of all users that passed a knowledge assessment	Measures how much variance there is from the standard mean score	<ul style="list-style-type: none"> <li>- Provides stakeholders with a metric to indicate a low SD (where the data points are close to the mean)</li> <li>- Provides stakeholders with an outlier metric to indicate a high SD (where the data are spread out over a large range of scores)</li> </ul>	<ul style="list-style-type: none"> <li>- Low Standard Deviation Report, Scorecard, or Dashboard</li> <li>- High Standard Deviation Report, Scorecard, or Dashboard</li> </ul>	Knowledge Assessment	<ul style="list-style-type: none"> <li>- context.registration</li> <li>- context.contextActivities.parent (array that includes the assessment Activity)</li> <li>- context.contextActivities.parent (object.definition.type (<a href="#">assessment</a>))</li> <li>- result.duration</li> <li>- result.success</li> <li>- result.completion</li> <li>- result.score.scaled</li> <li>- result.score.raw</li> <li>- timestamp</li> </ul>
Test Item Analysis	Number of correct and incorrect responses on a knowledge assessment	Measures validity of individual test questions in an assessment	<ul style="list-style-type: none"> <li>- Informs stakeholders of potential training effectiveness problems and revisions needed to the learning objectives, training activity, and assessment questions</li> </ul>	<ul style="list-style-type: none"> <li>- Test Item Analysis Report, Scorecard, or Dashboard</li> </ul>	Knowledge Assessment	<ul style="list-style-type: none"> <li>- context.registration</li> <li>- context.contextActivities.parent (array that includes the assessment Activity)</li> <li>- context.contextActivities.parent (object.definition.type (<a href="#">assessment</a>))</li> <li>- result.duration</li> <li>- result.success</li> <li>- result.completion</li> <li>- result.score.scaled</li> <li>- result.score.raw</li> <li>- timestamp</li> </ul>
Self-Reported Assessment Score (4.1 - 5.0)	Opinions or beliefs (attitudes) of users about the how much they learned	Measures the user's self-assertion of their increase in knowledge or skills after completing the training activity	<ul style="list-style-type: none"> <li>- Informs stakeholders of feedback about whether the users feel the training was effective for future on-the-job performance</li> </ul>	<ul style="list-style-type: none"> <li>- Learning Attitudes Report</li> <li>- Learning Attitudes Dashboard</li> <li>- Survey Responses Export (LRS) as CSV, JSON</li> </ul>	Survey	<ul style="list-style-type: none"> <li>- context.registration</li> <li>- context.contextActivities.parent (array that includes the assessment Activity)</li> <li>- context.contextActivities.parent (object.definition.type (<a href="#">assessment</a>))</li> <li>- result.duration</li> <li>- result.success</li> <li>- result.completion</li> <li>- result.score.scaled</li> <li>- result.score.raw</li> <li>- timestamp</li> </ul>
Observational Assessment Score (4.1 - 5.0)	Instructor observation and verification on a performance assessment	Measures the instructor's assertion of the user's successful or unsuccessful performance on a classroom lab exercise, drill, or hands-on skill activity	<ul style="list-style-type: none"> <li>- Provides stakeholders with additional evidence of the user's skills or performance of a task</li> </ul>	<ul style="list-style-type: none"> <li>- Observational Performance Assessment Scores Report, Scorecard, or Dashboard</li> </ul>	Survey	<ul style="list-style-type: none"> <li>- context.registration</li> <li>- context.contextActivities.parent (array that includes the assessment Activity)</li> <li>- context.contextActivities.parent (object.definition.type (<a href="#">assessment</a>))</li> <li>- result.duration</li> <li>- result.success</li> <li>- result.completion</li> <li>- result.score.scaled</li> <li>- result.score.raw</li> <li>- timestamp</li> </ul>
≥ 85% Scenario-Based Assessment Score	Number of problems recognized, correct actions taken, or correct sequence of actions by a user in a scenario-based simulation or assessment	Measures the users' decision-making or problem-solving skills after completing the training activity	<ul style="list-style-type: none"> <li>- Informs stakeholders of users' increased decision-making skills or abilities</li> <li>- Informs stakeholders of high and low performers</li> <li>- Provides a metric for comparing against other results</li> </ul>	<ul style="list-style-type: none"> <li>- Decision-Making Performance Report, Scorecard, or Dashboard</li> </ul>	Scenario-Based Assessment	<ul style="list-style-type: none"> <li>- context.registration</li> <li>- context.contextActivities.parent (array that includes the assessment Activity)</li> <li>- context.contextActivities.parent (object.definition.type (<a href="#">assessment</a>))</li> <li>- result.duration</li> <li>- result.success</li> <li>- result.completion</li> <li>- result.score.scaled</li> <li>- result.score.raw</li> <li>- timestamp</li> </ul>