

Sample Exercises | December 2023

Using the Academic Analytics Tool

The Academic Analytics Tool (AAT) was designed to enable users without computer science skills (e.g., teachers, learning designers, etc.) to directly access and analyze the large amounts of educational data stored within modern learning management systems (LMS) such as Moodle.

While some information is surfaced through these systems in the form of dashboards or reports, it can be difficult to access the full set of data, as well as evaluate changes in student user behaviour either across sections or revisions of a course, or differences between courses. AAT uses a wizard-style interface to guide users through the process of building patterns from all data available within the LMS, allowing them to "ask" questions to the database and get answers to almost any question about learners' behaviour and the impact of teaching methods and learning designs.

A brief video walkthrough of the Academic Analytics Tool is available on the AAT demo website at <https://www.academicanalytics.ca/howaatworks.php>

Note about test data

The LMS data available through the Academic Analytics test site is limited in scope and will not resemble data from real universities, either in breadth of material or depth of user interactions. Rather, we have provided a small sample set that allows users to step through AAT's most common functions and produce meaningful, easy to interpret results.

All data has been generated artificially. Student names in the sample data are randomly generated to ensure privacy and anonymity. Names and contact information of individuals used in the test data are fictitious. No identification with actual persons, courses, learning objects, resources or activities is intended or should be inferred.

Providing feedback

Once you have completed the exercises, we ask that you please take a moment to fill out our short user survey. The responses you provide will help us plan for future development of the AAT tool and its user interface. The survey is available via the AAT website at www.academicanalytics.ca/tryingaat.php.

Sample exercises

The following exercises are intended to help beginning users orient themselves to the use of the Academic Analytics Tool and understand what it possible. These exercises build on each other to show increasingly complex operations within the tool. In particular, these sample exercises help to evaluate if there is a relationship between the grades of a course quiz and discussion forum participation.

Questions regarding use of the tool or issues with completing any of the exercises can be directed to aat-admin@athabascau.ca.

Preparation

An AAT 'project' is used as a container to both define the data to be examined (i.e. which courses to include) as well as 'questions' you want to ask. These questions are described by patterns, which are themselves a simplified version of the structured query language (SQL) used when working with databases. As a first step, users should create a project that can be used for the exercises.

GOAL: Create a project that will use the data for two courses – **Data Science Basics** and **Developing Effective Time Management Skills** – as well as their revisions. Both courses have two revisions, noted as **Revision A** or **Revision B**.

Steps to complete:

1. From the home screen, click the **New Project** button; this will start the project creation wizard.
2. Click the **Create** button to create a new project.
3. Enter a name for your project; you can name it however you like, but for the purposes of this document we will call it "Sample Project".
4. Select the version of the LMS to use; your selection will determine which databases (and courses) are available. For the demo site, only **Moodle 3.11** will be listed, so select this option.
5. Create a new dataset for the project by clicking the **Create New DataSet** button; the courses available for inclusion will depend on the databases which have been registered with AAT. You will be presented with the full list of available courses, and you can include as many as you like. Note that these courses can span multiple databases, allowing users to analyze courses across more than one instance of Moodle.
6. From the dataset selector, enter a name (we'll use "Sample Dataset") and select the **Data Science Basics** and **Developing Effective Time Management Skills** courses – make sure to include both revisions of each.
7. Click the **Save and Continue** button to register this dataset with the project.

With this, your project will be saved and available for selection from the home screen if you return to AAT at a later time. At this time, you will be presented with the pattern selection screen, which allows you to create new patterns and select those patterns you wish to associate with your project. Patterns can be unique to your current project, included from other projects you have created, or added from other users who have made their patterns public and available for use.

We will start from the pattern selection screen for each of the exercises that follow.

Remember that our goal in this set of exercises is to analyze the relationship between quiz grade and number of discussion posts for each of the courses. As part of this analysis, we can explore changes in behaviour and outcomes across revisions and between courses.

Exercise 1

Our first step will be to identify the users that are registered in each revision of both courses. This simple pattern can then be cloned (copied) and extended in subsequent exercises.

GOAL: Identify all users registered in the *Data Science Basics* and the *Developing Effective Time Management Skills* courses.

Steps to complete:

1. From the pattern selection screen, click the **Create New Pattern** button; this will start the pattern creation wizard.
2. Click the **Create** button to begin.
3. Select the concepts you wish to include in your pattern; the list of concepts covers the range of entities (such as users), activities (such as quizzes) and resources (such as lessons) that can be created and manipulated within Moodle.
4. For this pattern, include the **User** and **Course** concepts.
5. The next screen will display a list of all the attributes (database fields) associated with each of the concepts you have selected. Values for the selected attributes will be displayed in your pattern results as individual columns.
6. For this pattern, include **Course Name** from the **Course** concept category, and **First Name**, **Last Name** and **Username** from the **User** concept category.
7. The following screen will allow you to set limits on what data is included; for this pattern we will not define any inclusion criteria for our results.
8. The final screen of the wizard, if the **User** concept has been included in the pattern, is the roles selection. This allows for only users with specific roles in a course to be included. You can use this screen to filter the pattern to only include students or instructors – or any other role defined for your instance of Moodle. You can also leave all roles unselected in order to include all users in the results.
9. For this pattern, select both **Student** and **Teacher** in order to ensure we're including only users with a relationship to the courses in our dataset.
10. From the save screen, enter a name for your pattern. We'll use "Exercise 1" here.

Reviewing your results:

Once you've created a pattern, you'll need to select that pattern and run your project in order to view (or preview) the pattern output. From the pattern selection screen:

1. Ensure the pattern you want to examine is selected (you can have as many selected as you like)

2. Click the **Continue** button to proceed with your pattern selection, for the specified dataset.
3. You will be presented with a summary of your project configuration, including the selected LMS, dataset and courses, and patterns; if everything looks correct, press the **Run Project** button to continue.
4. You will be presented with a list of your patterns, and the output formats that are available:
 - To **preview the pattern results**, click the pattern name. This will display a pop up with the first 100 results. For the examples in this document, the output screens have been generated based on the pattern preview.
 - Alternatively, you can **display the full pattern results** with the **Display full results table** link, or click any of the export options to download a copy of the full pattern results in a CSV, HTML, XML or PDF format.

Note that depending on how many rows are included in your pattern, it may take a few moments to generate or export the results.

If you wish to continue working with the project, you can click the **Back to Pattern List** button to return to your list of patterns – or you can use the **Back to Project List** to select a different project altogether.

Expected output:

Our expected output from this pattern is a list of all users in either revision of the *Data Science Basics* and *Effective Time Management* courses, similar to the following:

user_first_name	user_last_name	user_username	course_name	user_id	course_id
Fiona	Toogood	tool_generator_000456	Data Science Basics (Revision B)	488	14
John	Holmes	tool_generator_000687	Data Science Basics (Revision B)	719	14
Sarah	Cox	tool_generator_000280	Data Science Basics (Revision A)	312	12
Sophia	Smith	tool_generator_000314	Data Science Basics (Revision B)	346	14
Alex	Wolowicz	tool_generator_000408	Developing Effective Time Management Skills (Revision B)	440	15
Emma	Murwood	tool_generator_000305	Data Science Basics (Revision B)	337	14
Jake	Hansen	tool_generator_000628	Developing Effective Time Management Skills (Revision A)	660	13
Jessica	White	tool_generator_000398	Developing Effective Time Management Skills (Revision B)	430	15
Emily	Richardson	tool_generator_000540	Developing Effective Time Management Skills (Revision A)	572	13
Rachael	Gardiner	tool_generator_000816	Data Science Basics (Revision A)	848	12
Emily	Miller	tool_generator_000071	Data Science Basics (Revision A)	103	12
Mia	Morrow	tool_generator_000956	Developing Effective Time Management Skills (Revision A)	988	13
Royce	Stevens	aat1	Data Science Basics (Revision A)	3	12
Jessica	Blumberg	tool_generator_000626	Data Science Basics (Revision A)	658	12
Adam	Wilmut	tool_generator_000859	Data Science Basics (Revision A)	891	12
David	Clough	tool_generator_000360	Data Science Basics (Revision A)	392	12
Emily	Brown	tool_generator_000175	Developing Effective Time Management Skills (Revision B)	207	15
Alex	Novak	tool_generator_000531	Developing Effective Time Management Skills (Revision A)	563	13
Sarah	Topps	tool_generator_000452	Developing Effective Time Management Skills (Revision A)	484	13
Max	Martin	tool_generator_000535	Developing Effective Time Management Skills (Revision A)	567	13
Jason	Robertson	tool_generator_000723	Data Science Basics (Revision B)	755	14
James	Woodward	tool_generator_000701	Developing Effective Time Management Skills (Revision B)	733	15

Exercise 2

In order to determine the relationship between quiz grade and forum participation, we will need to calculate both the quiz grade and the number of discussion posts for each student. Start by looking at the quiz grades for all students – in particular the “Final assessment” quiz, which can be used as a measure for overall performance in each course. The next exercise will focus on forum participation.

GOAL: Calculate the assigned quiz grade for each student on the “Final assessment” quiz in both courses.

Steps to complete:

1. For the second exercise, we will copy our pattern from **Exercise 1** and extend it with additional information.
2. From the pattern selection screen, click the **Create New Pattern** button and then click the **Clone** button to begin. Cloning an existing pattern can save you work if you are creating multiple similar patterns.
3. Select the **Exercise 1** pattern you created previously and click **Continue**.
4. You'll notice that the concepts for the previous pattern are already selected. Add the **Quiz** concept.
5. From the attribute selection screen, select **Quiz grade: Quiz grade** and **Quiz: Quiz name** from the **Quiz** concept category.
6. From the limits screen, create a limit (filter) for the assignment name. The *Data Science Basics* course includes two quizzes, and we want to ensure we're only pulling in grades from the final assessment quiz.
7. In the **Quiz: Quiz name** row, select **Like** from the limit type drop-down, and enter "Final assessment" in the user-defined value textbox. Selecting a limit type of **Equals** would enforce an exact match for the supplied value, while **Like** will perform a case-insensitive match for any result that *includes* the supplied value.
8. From the roles screen, we can leave the roles unselected as only students will have quiz grades. Or if you want to be safe, you can select the Student role from the list.
9. From the save screen, name your pattern "Exercise 2" and click **Save**.

Expected output:

Our expected output from this pattern is a list of all users, the course name and quiz name, and the grade each student received on the assignment. Note that only students who have taken the quiz and received a grade will be included:

user_first_name	user_last_name	user_username	course_name	quiz_grade_quiz_grade	quiz_quiz_name	user_id	course_id	quiz_grades_id	quiz_id
Jayden	Argent	tool_generator_000450	Developing Effective Time Management Skills (Revision B)	7.50000	Final assessment	482	15	19	8
Ava	Adams	tool_generator_000650	Developing Effective Time Management Skills (Revision A)	10.00000	Final assessment	682	13	20	6
Liam	Archer	tool_generator_000656	Developing Effective Time Management Skills (Revision A)	9.16667	Final assessment	688	13	21	6
Jake	Hansen	tool_generator_000628	Developing Effective Time Management Skills (Revision A)	10.00000	Final assessment	660	13	22	6
Max	Martin	tool_generator_000535	Developing Effective Time Management Skills (Revision A)	7.50000	Final assessment	567	13	23	6
Mia	Morrow	tool_generator_000956	Developing Effective Time Management Skills (Revision A)	10.00000	Final assessment	988	13	24	6
Alex	Novak	tool_generator_000531	Developing Effective Time Management Skills (Revision A)	9.16667	Final assessment	563	13	25	6
Emily	Richardson	tool_generator_000540	Developing Effective Time Management Skills (Revision A)	8.33333	Final assessment	572	13	26	6
Sarah	Toppa	tool_generator_000452	Developing Effective Time Management Skills (Revision A)	10.00000	Final assessment	484	13	27	6
Elmer	Avers	tool_generator_000584	Developing Effective Time Management Skills (Revision B)	9.16667	Final assessment	616	15	28	8
Sarah	Blume	tool_generator_000805	Developing Effective Time Management Skills (Revision B)	9.16667	Final assessment	837	15	29	8
Jayden	Brown	tool_generator_000958	Developing Effective Time Management Skills (Revision B)	9.16667	Final assessment	990	15	30	8
David	Ernest	tool_generator_000015	Developing Effective Time Management Skills (Revision B)	10.00000	Final assessment	47	15	31	8
Thomas	Jones	tool_generator_000290	Developing Effective Time Management Skills (Revision B)	10.00000	Final assessment	322	15	32	8
Emma	Murwood	tool_generator_000305	Developing Effective Time Management Skills (Revision B)	10.00000	Final assessment	337	15	33	8
Jessica	White	tool_generator_000398	Developing Effective Time Management Skills (Revision B)	8.33333	Final assessment	430	15	34	8
Alex	Wolowicz	tool_generator_000408	Developing Effective Time Management Skills (Revision B)	10.00000	Final assessment	440	15	35	8
James	Woodward	tool_generator_000701	Developing Effective Time Management Skills (Revision B)	10.00000	Final assessment	733	15	36	8
Eloise	Sagert	tool_generator_000337	Developing Effective Time Management Skills (Revision B)	10.00000	Final assessment	369	15	37	8
Emily	Brown	tool_generator_000175	Developing Effective Time Management Skills (Revision B)	10.00000	Final assessment	207	15	38	8
Jessica	Blumberg	tool_generator_000626	Data Science Basics (Revision A)	10.00000	Final assessment	658	12	39	5
David	Clough	tool_generator_000360	Data Science Basics (Revision A)	7.00000	Final assessment	392	12	40	5
Sarah	Cox	tool_generator_000280	Data Science Basics (Revision A)	10.00000	Final assessment	312	12	41	5
Ashleigh	Evans	tool_generator_000937	Data Science Basics (Revision A)	9.00000	Final assessment	969	12	42	5
Alex	Frisky	tool_generator_000646	Data Science Basics (Revision A)	9.00000	Final assessment	678	12	43	5
Rachael	Gardiner	tool_generator_000816	Data Science Basics (Revision A)	5.00000	Final assessment	848	12	44	5
Emily	Miller	tool_generator_000071	Data Science Basics (Revision A)	10.00000	Final assessment	103	12	45	5
James	Smith	tool_generator_000197	Data Science Basics (Revision A)	7.00000	Final assessment	229	12	46	5

To review your output, follow the steps in the [Reviewing your results](#) section of **Exercise 1**.

Exercise 3

Next, we will look at the number of discussion posts made in both revisions of each course. Unlike assignments, we need to explicitly include only students in the results, as we can expect that the instructor (or any course tutors) may be posting in the discussion forums as well.

GOAL: Identify the discussion posts made by students in both courses, and then calculate the total number of posts per course and revision. Which course had the higher number of posts? Are the number of posts consistent between the revisions for each course?

Steps to complete (Part A):

This exercise will involve two parts: creating the pattern and conducting an analysis on the pattern results. In the context of AAT, an analysis lets us aggregate pattern results on one of the selected concept attributes, and include a calculated column based on this attribute (such as counting the number of posts).

1. To begin, start by cloning the pattern from **Exercise 1** again.
2. From the concept selection screen, add the **Post** concept (its included as a concept under **Forum**).
3. From the attribute selection screen, add **Forum post subject** from the **Post** concept category. This will add one row for every user and every post they have made (whether an original discussion post or a reply) in each course.
4. Leave the limits screen blank; since we're looking at overall forum engagement in each course, we want to include all posts even if they're in different forums.
5. From the roles screen, select only the **Student** role.
6. Save the pattern with the name "Exercise 3".

Expected output (Part A):

Our expected output for this pattern is a list of all users, the course name, and the forum post subject, as follows:

user_first_name	user_last_name	user_username	course_name	forum_post_subject	user_id	course_id	forum_posts_id
Sarah	Cox	tool_generator_000280	Data Science Basics (Revision A)	Intro	312	12	697
Rachael	Gardiner	tool_generator_000816	Data Science Basics (Revision A)	Trouble Submitting Assignment via Moodle - Anyone Else Having Issues?	848	12	695
Rachael	Gardiner	tool_generator_000816	Data Science Basics (Revision A)	Re: Privacy and ethics	848	12	684
Rachael	Gardiner	tool_generator_000816	Data Science Basics (Revision A)	Re: AI and influence on data science?	848	12	683
Emily	Miller	tool_generator_000071	Data Science Basics (Revision A)	Introductions - Emily Miller	103	12	669
Emily	Miller	tool_generator_000071	Data Science Basics (Revision A)	AI and influence on data science?	103	12	670
Royce	Stevens	aati	Data Science Basics (Revision A)	Re: Trouble Submitting Assignment via Moodle - Anyone Else Having Issues?	3	12	696
Royce	Stevens	aati	Data Science Basics (Revision A)	Assignment: Feedback and Next Steps	3	12	765
Jessica	Blumberg	tool_generator_000626	Data Science Basics (Revision A)	Hi!	658	12	665
Adam	Wilmut	tool_generator_000859	Data Science Basics (Revision A)	Re: Introductions	891	12	677
Adam	Wilmut	tool_generator_000859	Data Science Basics (Revision A)	Adam Wilmut	891	12	676
Adam	Wilmut	tool_generator_000859	Data Science Basics (Revision A)	Privacy and ethics	891	12	679
Adam	Wilmut	tool_generator_000859	Data Science Basics (Revision A)	Re: AI and influence on data science?	891	12	678
David	Clough	tool_generator_000360	Data Science Basics (Revision A)	Re: Hi!	392	12	687
David	Clough	tool_generator_000360	Data Science Basics (Revision A)	David Clough	392	12	666
Alex	Frisby	tool_generator_000646	Data Science Basics (Revision A)	Introductions	678	12	668
Alex	Frisby	tool_generator_000646	Data Science Basics (Revision A)	Re: David Clough	678	12	667
Martin	Tooms	tool_generator_000766	Data Science Basics (Revision A)	Re: AI and influence on data science?	708	12	673
Ashleigh	Evans	tool_generator_000937	Data Science Basics (Revision A)	Ashleigh Evans	969	12	690
Ashleigh	Evans	tool_generator_000937	Data Science Basics (Revision A)	Re: Privacy and ethics	969	12	689
James	Smith	tool_generator_000197	Data Science Basics (Revision A)	Getting caught up...	229	12	720
Sarah	Cox	tool_generator_000280	Data Science Basics (Revision A)	Ethical Considerations in Data Science	312	12	698
Rachael	Gardiner	tool_generator_000816	Data Science Basics (Revision A)	Re: The Power of Data Visualization in Storytelling	848	12	693
Rachael	Gardiner	tool_generator_000816	Data Science Basics (Revision A)	The Power of Data Visualization in Storytelling	848	12	685
Emily	Miller	tool_generator_000071	Data Science Basics (Revision A)	Reflection on My First Data Science Project	103	12	671
David	Clough	tool_generator_000360	Data Science Basics (Revision A)	The Joy of Exploratory Data Analysis (EDA)	392	12	688

To review your output, follow the steps in the **Reviewing your results** section of **Exercise 1**.

Steps to complete (Part B):

Now that we have our results, we want to count the number of posts for each course.

1. From the pattern selection screen, click the **Create New Pattern** button.
2. Click **Analyze** to begin an analysis (aggregation) of the pattern results.

1. Select the **Exercise 3** pattern you created previously and click **Continue**.
2. From the analysis screen, select **Analysis with one column as result**. This will allow us to create a table of values. Selecting **Analysis with one value as result** and proceeding with the remaining steps would give you the total number of posts in the whole data set. You can try this out for yourself if you like (the expected result should be **137**).
3. Select **ENTRY COUNT** to count the number of rows (posts) and choose **Course** from the drop-down box.
4. Give the result column a name (such as “Count of posts”) and name the analysis “Analysis for Exercise 3”.
5. Click the **Perform Analysis** button to preview the results, and if you get something that matches the expected output below, click **Save Analysis** to complete the process.

Expected output (Part B):

Our expected output for this pattern is a list of all courses and the total number of discussion posts made in each course (across all discussion forums):

course_id	course_name	Count of posts
12	Data Science Basics (Revision A)	28
14	Data Science Basics (Revision B)	23
13	Developing Effective Time Management Skills (Revision A)	38
15	Developing Effective Time Management Skills (Revision B)	48

You can try switching the aggregation concept to User instead, to see the number of posts each student has made, as follows:

user_id	user_first_name	user_last_name	user_username	Count of posts
3	Royce	Stevens	aat1	9
47	David	Ernest	tool_generator_000015	3
103	Emily	Miller	tool_generator_000071	3
207	Emily	Brown	tool_generator_000175	3
229	James	Smith	tool_generator_000197	1
261	Lily	Tru	tool_generator_000229	4
312	Sarah	Cox	tool_generator_000280	2
322	Thomas	Jones	tool_generator_000290	1
337	Emma	Murwood	tool_generator_000305	4
339	David	Seeley	tool_generator_000307	2
346	Sophia	Smith	tool_generator_000314	2
369	Eloise	Sagert	tool_generator_000337	2
392	David	Clough	tool_generator_000360	3
430	Jessica	White	tool_generator_000398	6
440	Alex	Wolowicz	tool_generator_000408	5
482	Jayden	Argent	tool_generator_000450	3
484	Sarah	Topps	tool_generator_000452	3
488	Fiona	Toogood	tool_generator_000456	2
563	Alex	Novak	tool_generator_000531	5
567	Max	Martin	tool_generator_000535	4
572	Emily	Richardson	tool_generator_000540	3
616	Elmer	Avers	tool_generator_000584	7

To review your output, follow the steps in the [Reviewing your results](#) section of **Exercise 1**.

Exercise 4

Finally, we should match the number of discussion posts made by each student to their course quiz grade. We can do this by ‘chaining’ two patterns together to make a more complex pattern.

GOAL: Prepare a pattern which includes both the number of discussion posts for each student and the grade on the course assignment. Export the results to prepare for further analysis.

Steps to complete:

1. Create two patterns to chain (join) together. Chaining patterns lets you combine data from two patterns by 'matching' on a common attribute value (for example, Moodle username). Since we are trying to join quiz grades and discussion posts, we can use the patterns we created for **Exercise 2** and **Exercise 3**.
1. From the pattern selection screen, click the **Create New Pattern** button.
2. Click **Chain** to begin creating a chain.
3. For the **base pattern**, select **Exercise 3**; this will refresh the list of patterns that can be chained to the base pattern. This filtering is done by evaluating which patterns have at least one concept in common.
4. For the **pattern to chain to the base**, select **Exercise 2** and click **Continue**.
5. Select **User** as the chaining concept. This will concatenate results in both patterns based on a matching user identifier (in this case, user id). Click **Continue**.
6. Name your chain as "Chain for Exercises 3 and 2" and click **Save**.

Expected output:

Our expected output for this pattern is a list of every user and every post, joined with the quiz grade for that user:

user_first_name	user_last_name	user_username	course_name	forum_post_subject	user_id	course_id	forum_posts_id	user_first_name	user_last_name	user_username	course_name	quiz_grade	quiz_quiz_name	user_id	course_id	quiz_grades_id
Alex	Frisby	tool_generator_000646	Data Science Basics (Revision A)	Introductions	678	12	668	Alex	Frisby	tool_generator_000646	Data Science Basics (Revision A)	9.00000	Final assessment	678	12	43
Alex	Frisby	tool_generator_000646	Data Science Basics (Revision A)	Re: David Clough	678	12	667	Alex	Frisby	tool_generator_000646	Data Science Basics (Revision A)	9.00000	Final assessment	678	12	43
Martin	Tooms	tool_generator_000766	Data Science Basics (Revision A)	Challenges and Solutions in Data Wrangling	798	12	672	Martin	Tooms	tool_generator_000766	Data Science Basics (Revision A)	9.00000	Final assessment	798	12	47
Martin	Tooms	tool_generator_000766	Data Science Basics (Revision A)	Re: AI and influence on data science?	798	12	673	Martin	Tooms	tool_generator_000766	Data Science Basics (Revision A)	9.00000	Final assessment	798	12	47
Emily	Miller	tool_generator_000071	Data Science Basics (Revision A)	Reflection on My First Data Science Project	103	12	671	Emily	Miller	tool_generator_000071	Data Science Basics (Revision A)	10.00000	Final assessment	103	12	45
Emily	Miller	tool_generator_000071	Data Science Basics (Revision A)	AI and influence on data science?	103	12	670	Emily	Miller	tool_generator_000071	Data Science Basics (Revision A)	10.00000	Final assessment	103	12	45
Emily	Miller	tool_generator_000071	Data Science Basics (Revision A)	Introductions - Emily Miller	103	12	669	Emily	Miller	tool_generator_000071	Data Science Basics (Revision A)	10.00000	Final assessment	103	12	45
James	Smith	tool_generator_000197	Data Science Basics (Revision A)	Getting caught up...	229	12	720	James	Smith	tool_generator_000197	Data Science Basics (Revision A)	7.00000	Final assessment	229	12	46
Sarah	Cox	tool_generator_000280	Data Science Basics (Revision A)	Ethical Considerations in Data Science	312	12	698	Sarah	Cox	tool_generator_000280	Data Science Basics (Revision A)	10.00000	Final assessment	312	12	41
Sarah	Cox	tool_generator_000280	Data Science Basics (Revision A)	Intro	312	12	697	Sarah	Cox	tool_generator_000280	Data Science Basics (Revision A)	10.00000	Final assessment	312	12	41
David	Clough	tool_generator_000360	Data Science Basics (Revision A)	The Joy of Exploratory Data Analysis (EDA)	392	12	688	David	Clough	tool_generator_000360	Data Science Basics (Revision A)	7.00000	Final assessment	392	12	40

To review your output, follow the steps in the [Reviewing your results](#) section of **Exercise 1**.

Exporting results:

Note that some calculations are beyond the scope of what AAT can handle at present. For example, we cannot chain together two analyses, or one analysis that aggregates posts to get a post count per user, and a pattern with the quiz grade per user. For more advanced analysis, the export links can be used to download a copy of the output, which can then be manipulated using software such as SPSS or Excel.

Exercise 5

As noted, AAT can help facilitate exploring data and patterns between courses. As a simple example, we can use AAT to identify any students who participated in both courses and look at whether they received a higher course grade in the *Data Science Basics* or *Developing Effective Time Management Skills* Course.

GOAL: Identify students who took both courses and determine in which course they had the better grade.

Steps to complete:

The process for this exercise is similar to that of Exercise 4, in that we will chain two patterns together. Here though, we need two patterns which each contain only students from one course.

1. From the pattern selection screen, create two patterns following the steps for **Exercise 1**.
2. On the limits screen, for the first pattern add a limit of type **LIKE** and user-defined value “Data Science Basics”. Note that we need to use the **LIKE** type here, to ensure we include both Revision A and Revision B in our results (remember that **LIKE** performs a case-insensitive partial match on the attribute value).
3. This will create a list of students only in the data science course. Name this pattern “Exercise 5A”.
4. For the second pattern, add a limit of type **LIKE** and user-defined value “Developing Effective Time Management Skills”. Name this pattern “Exercise 5B”.
5. From the pattern selection screen, click the **Create New Pattern** button.
6. Click **Chain** to begin creating a chain.
7. For the **base and chain patterns**, select **Exercise 5A** and **Exercise 5B**.
8. Select **User** as the chaining concept.
9. Select Show only matched results between patterns. This will limit the results to only users who have a record in **both** of the base patterns.
10. Name your chain as “Chain for Exercise 5” and click **Save**.

Expected output:

Our expected output for this pattern is a list of every user that has an enrolment in one of the revisions for both the *Data Science Basics* and *Developing Effective Time Management Skills* courses, along with the grade they received in each. In this example, there should only be one result, as follows:

user_first_name	user_last_name	course_name	quiz_grade	quiz_grade	user_id	course_id	quiz_grades_id	quiz_id	user_first_name	user_last_name	course_name	quiz_grade	quiz_grade	user_id	course_id	quiz_grades_id	quiz_id
Emma	Murwood	Data Science Basics (Revision B)	9.00000		337	14	34	7	Emma	Murwood	Developing Effective Time Management Skills (Revision B)	10.00000		337	15	33	8

To review your output, follow the steps in the [Reviewing your results](#) section of **Exercise 1**.