User Manual for Charts and analysis module (Zeyu Lin's component)

Charts and analysis module includes three pages: Moodle charts, WebSubmission charts, Critical questions.

To summarize, charts and analysis module has the following advantages: It provides visualization by using charts, which make the data intuitive and easy to read. It provides lots of configuration options and related functions (set period, change presentation order, threshold function, export data in CSV format, event name/ event context auto-complete), which allow user to further explore and manipulate data. It allows user to choose course, year, semester, assignment. It provides data of individual student as well as the whole class. It provides the amount of different events in a given period as well as the amount of specific event of each day. It links two data sources and links the users of two data sources. It provides cross-data analysis by allowing user to explore the relationship between the amount of students' activities and academic performances.

The first page is "Moodle charts".

(1) In each page, user is allowed to select course, year, semester, assignment (see Fig. 1). When user changes one of these drop-down boxes, the rest of the drop-down boxes will be filtered. After user selects semester, the start day, end day of the semester and all assignments are provided, the period (input boxes) of all charts will be set to the period of that semester and all charts will be updated to the period of that semester. After user selects assignment, the period (input boxes) of all charts will be set to the period of that assignment and all charts will be updated to the period of that assignment(see Fig. 2).

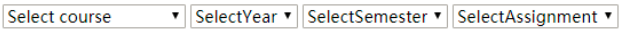


Figure 1: Select course, year, semester, assignment.

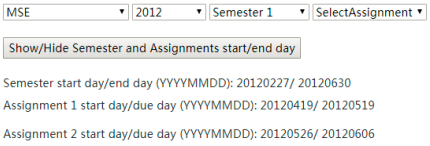


Figure 2: Select semester and assignment.

(2) The chart "Student Activities Overview" calculates the amount of all Moodle activities of each student in the given period (see Fig. 3). Generally, the following configuration options are provided for all charts to enable user to manipulate data. User can change the presentation order (including alphabetical order, descending order and ascending order), set the period (start day and end day), set the threshold (e.g. only show those students with amount of activities greater or less than a certain value), export data in CSV format and include the chart name and all configuration options in the file name (see Fig. 4).

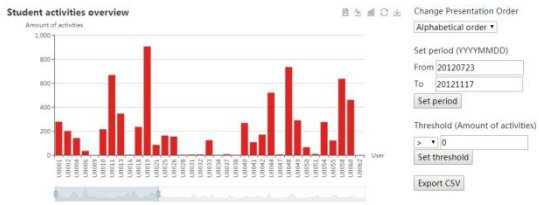
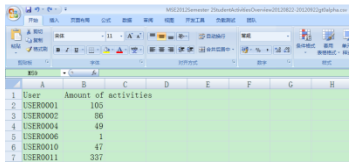


Figure 3: The chart "Student Activities Overview" and configuration options.



	User	Amount of activities
2	USER0001	105
3	USER0002	86
4	USER0004	49
5	USER0006	1
6	USER0010	47
7	USER0011	337

Figure 4: Export data in CSV format.

(3) When your mouse hovers over a bar of the chart, the detailed data of that bar will be displayed (see Fig. 5). When user clicks a bar, it will lead to another page showing the amount of event names and event contexts of that student (a bar stands for a student) in the given period (see Fig. 6).

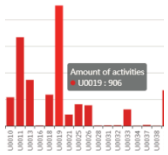
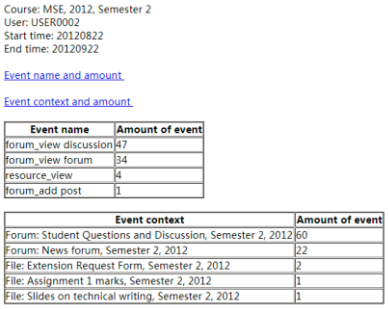


Figure 5: Mouse hovers over the bar.



Event name	Amount of event
forum_view discussion	47
forum_view forum	34
resource_view	4
forum_add post	1

Event context	Amount of event
Forum: Student Questions and Discussion, Semester 2, 2012	60
Forum: News forum, Semester 2, 2012	22
File: Extension Request Form, Semester 2, 2012	2
File: Assignment 1 marks, Semester 2, 2012	1
File: Slides on technical writing, Semester 2, 2012	1

Figure 6: Clicking a bar will lead to another page showing the amount of event names and event contexts of that student (a bar stands for a student) in the given period.

(4) When there are too many data (say more than 200), ECharts has a built-in mechanism to deal with this. It will only show some of the x-labels when there is not enough space to accommodate all the x-labels, which is confusing, misleading and incorrect. I have creatively designed a mechanism to deal with x-label issue when users shrink and expand the slider. No x-label will be displayed until they can be displayed correctly to ensure the accuracy and correctness of information. Different thresholds are set. When users shrink and expand the time span, in different stages x-labels

can be displayed rotating at 90, 40 and 0 degree, depending on the amount of data and available space (see Fig. 5, 7, 8).

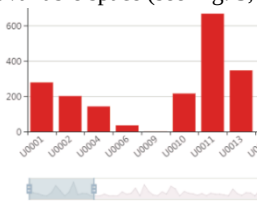


Figure 7: Display x-labels at 40 degrees.

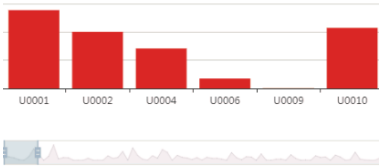


Figure 8: Display x-labels normally (at 0 degree).

(5) The chart "All activities overview" calculates the total amount of Moodle activities of all students each day (see Fig. 9).

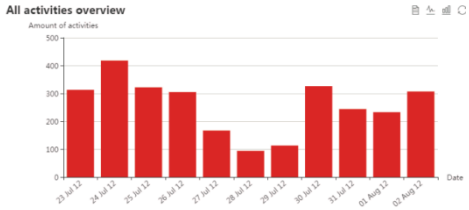


Figure 9: The chart "All activities overview".

(6) The chart "Event names overview" calculates the total amount of each event name of all students in the given period (see Fig. 10).

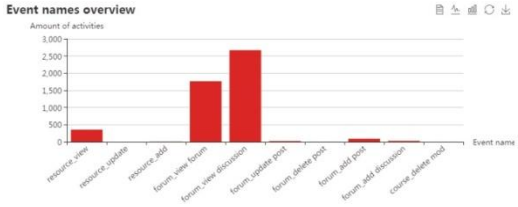


Figure 10: The chart "Event names overview".

(7) The chart "Specific event name overview" is related with the chart "Event names overview". The chart "Event names overview" calculates the total amount of each event name of all students in the given period while the chart "Specific event name overview" tells the amount of the specific event name of all students each day. The content of the chart "Specific event name overview" is set by user. When user inputs some characters, "auto-complete" will provide options based on the characters user inputs, the period and the threshold (see Fig. 11). Then user can choose one of the options that "auto-complete" provides and click the button "Set Event name", the content of the chart will be set to that specific event name (see Fig. 12).

Figure 11: The chart "Specific event name overview" and event name auto-complete.

Figure 12: Set event name for the chart "Specific event name overview".

(8) The chart "Event contexts overview" calculates the total amount of each event context of all students in the given period.

(9) The chart "Specific event context overview" is related with the chart "Event contexts overview". The chart "Event contexts overview" calculates the total amount of each event context of all students in the given period while the chart "Specific event context overview" tells the amount of the specific event context of all students each day. The content of the chart "Specific event context overview" is set by user. When user inputs some characters, "auto-complete" will provide options based on the characters user inputs, the period and the threshold (see Fig. 13). Then user can choose one of the options that "auto-complete" provides and click the button "Set Event context", the content of the chart will be set to that specific event context (see Fig. 14).

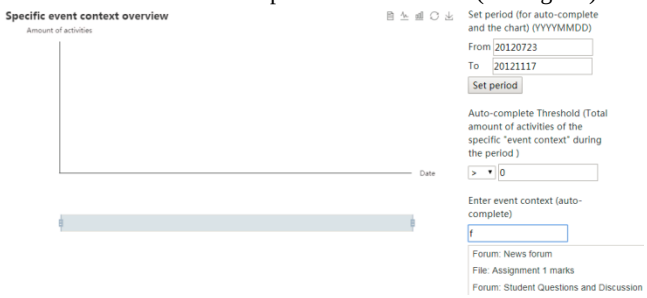


Figure 13: The chart "Specific event context overview" and event context auto-complete.

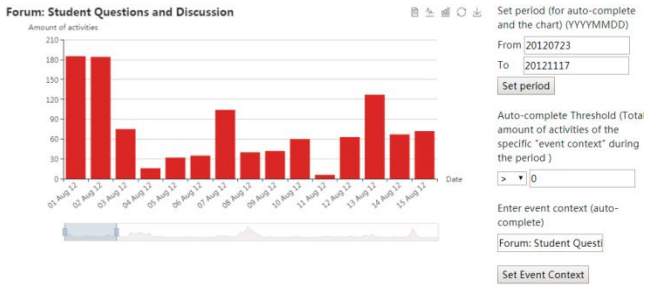


Figure 14: Set event context for the chart "Specific event context overview".

The second page is "WebSubmission charts". In this page, all the charts are compressed down to "assignment level" because the visualization is related with submission. User is allowed to choose course, year, semester and assignment, then all the charts will be updated to that specific assignment user chooses.

(10) The chart "Submission Time Distribution 5 Days (Submissions)" calculates the amount of submissions (including multiple submissions) 5 days before and after due day (see Fig. 15). The due day is annotated in the chart. "0" stands for due day. "-1" stands for one day before the due day while "+1" stands for one day after the due day. The amount of submissions doesn't reflect the engagement of the class because some active students may submit a lot of times. A similar chart "Submission Time Distribution 5 Days (Students)" is provided, which calculates the number of students who submit (one student submitting multiple times in one day will only be counted once) 5 days before and after due day.

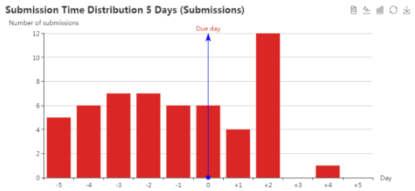


Figure 15: The chart "Submission Time Distribution 5 Days (Submissions)".

(11) The chart "Submission Time Distribution 96 Hours (Submissions)" calculates the amount of submissions (including multiple submissions) 96 hours before and after due hour. The due hour is annotated in the chart. "0" stands for due hour. "-1" stands for one hour before the due hour while "+1" stands for one hour after the due hour. The amount of submissions doesn't reflect the engagement of the class because some active students may submit a lot of times. A similar chart "Submission Time Distribution 96 Hours (Students)" is provided, which calculates the number of students who submit (one student submitting multiple times in one hour will only be counted once) 96 hours before and after due hour.

(12) The chart "Submission Time Distribution (Submissions)" calculates the amount of submissions (including multiple submissions) from the start day of the assignment till five days after due date (see Fig. 16). The start day and due day are annotated in the chart. "0" stands for due day. "-1" stands for one day before the due day while "+1" stands for one day after the due day. The amount of submissions doesn't reflect the engagement of the class because some active students may submit a lot of times. A similar chart "Submission Time Distribution (Students)" is provided, which calculates the number of students who submit (one student submitting multiple times in one day will only be counted once) from the start day of the assignment till five days after due date.

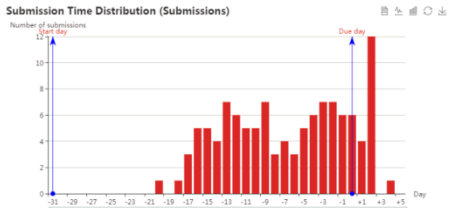


Figure 16: The chart "Submission Time Distribution (Submissions)".

(13) The chart "First Submission Time Distribution" only takes into consideration the minimum repository version of each student for that specific assignment. The chart "Last Submission Time Distribution" only takes into consideration the maximum repository version of each student for that specific assignment.

(14) The chart "Number Of Submissions Of Each Student" calculates the number of submissions (including multiple submissions) of each student for that specific assignment (see Fig. 24). User is allowed to change presentation order (alphabetical order, descending order, ascending order).

(15) The chart "Mark Distribution" is configurable. The first option is to aggregate marks by Marking Scheme 10 (see Fig. 17). The second option is to aggregate marks by 10% step. Since students are allowed to have multiple submissions, only the highest mark of all submissions of each student is counted.

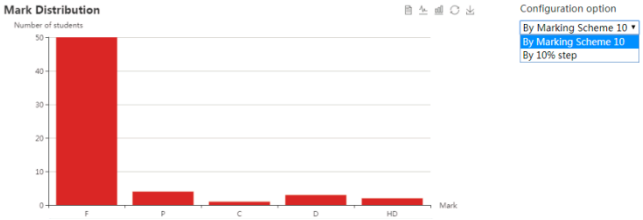


Figure 17: The chart "Mark Distribution", marks aggregated by Marking Scheme 10.

The third page is "Critical questions" module (see Fig. 18). It can answer a series of questions that the clients are interested in. Here are two example questions: (a) Do students who post more get higher marks for assignment? (b) Do students who view more resources on forum get higher marks for assignment? The "Critical questions" module links the two systems (Moodle forum and WebSubmission system) and links the users of the two systems.

(16) When user clicks the button "Update", the drop down boxes for "Event name" and "Event context" will be filtered based on course, start day and end day (see Fig. 19). After user chooses and inputs all necessary fields, clicking the button "Get answer" will give the Pearson Correlation Coefficient and detailed data of each student (see Fig. 20).

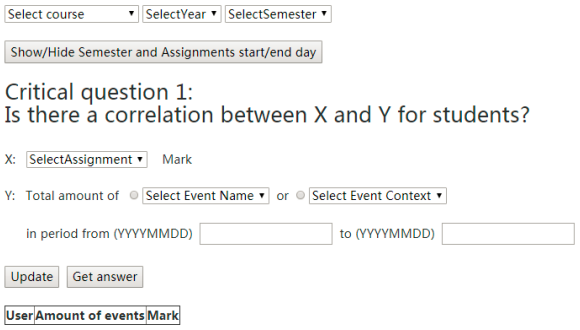


Figure 18: Critical questions module (a).

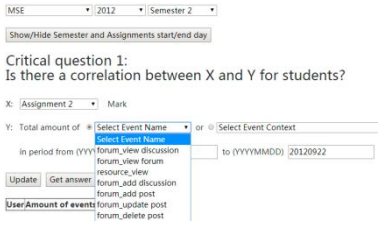


Figure 19: Critical questions module (b).

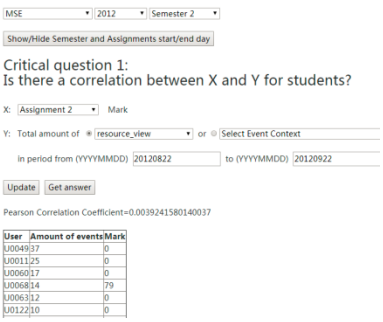


Figure 20: Critical questions module (c).