VizH5P: Visualize the results of H5P contents in Drupal 8

Yash Thakur 11641170

***Abstract*— H5P or HTML5 Package allows creating interactive educational content just with the help of a browser. Instructors use it all over the world. H5P is integrated with Content Management Systems like Moodle, Drupal, and Sunbird. An H5P module for Drupal 8 allows to create interactive content in Drupal 8 and later one can embed the content in any web page. H5P supports xAPI and allows to capture user interaction data with H5P content. The amount of data that can be obtained with the help of xAPI can provide meaningful insight to the instructor about user's interactions with the content. This can help an instructor to improve their content for better learning.**

For any interactions made with an H5P content, interaction details are generated, but H5P plugin for Drupal, WordPress or Moodle do not capture these details. Thus content developers lose such vital information. The module VizH5P is developed with the aim to obtain that information and present it in a manner that is easy to interpret.

Keywords—Educational data analysis, Drupal in education, H5P, interactive content, xAPI

I. Introduction

H5P stands for HTML 5 Package. H5P allows instructors to create, share and reuse interactive HTML5 content in the browser. One can create interactive videos, quizzes, etc. H5P content does not require any plugin or codec for its creation, delivery or use. A web browser is the only thing what a teacher needs to create and distribute H5P content among the students. Instructors are using H5P to create interactive educational content. Plugins for H5P are available for Drupal, WordPress, and Moodle.

Drupal is an open source Content Management System used for website development[1]. It accommodates a variety of content types ranging from audio, video to image and text. Drupal's H5P plugin allows an instructor to create H5P content in Drupal. The H5P content, created in Drupal, can be embedded in any web page for delivery.

H5P uses xAPI to capture user interactivity with the content created using H5P[2]. xAPI stands for experience API and captures data in a consistent format about a person's activities with the content. H5P module for Drupal 8 stores only basic results such as minimum score, maximum scores, and content ID. This basic information does not help a teacher to decide how to improve the content.

If content creators have a better track of the interactions made with their work, it can help them in improving content quality. This project aims to achieve the same.

This paper is organized as follows. Section II describes the purpose of VizH5P module. Section III describes the workflow of the complete system. Section IV describes the usefulness of the system by presenting the output of the custom module. Lastly, I present the conclusions in Section V.

II. Purpose

H5P library has thirty-nine different types of interactive contents, which can be used by educators as a template to build their interactive exercises. But H5P module for Drupal 8 loses the details of interaction data and provide a less informative representation of the result.

Purpose of this module is to capture and store this lost user-interaction data. It presents the data in a graphical manner, which makes it easy for the content creators to analyze a user's experience with the content.

III. Workflow of VizH5P

Fig 1 represents the workflow and all components of the custom module, VizH5P. VizH5P executes when a user interacts with an H5P content. H5P content generates xAPI statements which contain the user interaction details. VizH5P captures these xAPI statements.

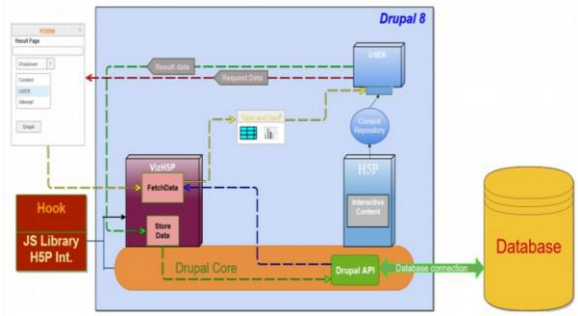

Fig. 1. VizH5P Workflow

The format of these objects is altered to string format. Then it makes an AJAX call to a URL, which is predefined inside VizH5P. This call invokes a function of the Controller class and data is sent to the class by POST method.

Controller class of Drupal 8 invokes a service to get access to the database and stores the data into the VizH5P table. Then VizH5P presents the user with a form. This form requires the id of the activity, the username of the user and the attempt number for that activity.

GraphForm class creates the structure and functional workspace of the form page. It generates the form and also attaches two libraries. First one for coupling plotly minimized version library[3]. Second is custom javascript to bring on the graphical and tabular representation of the requested result data.

Once the user fills the form, details are passed to the graph.js library. It makes an AJAX call to the GraphController class, and data is sent through POST method. GraphController class retrieves the result data from the database according to the choices it received. Then this information is used to calculate twelve different attributes of the graph.

IV. Result

An admin of Drupal 8 can view the result of VizH5P by visiting the result page created by the module. Upon selecting the content id (unique id of H5P content), one can see the information of interaction in two formats: tabular and graphical.

The tabular representation of an H5P content interaction data is present in Fig 3.

Table Data

Time	Content ID	Actor	Verb
2018-06-28 16:42:51.615	1	admin	attempted
2018-06-28 16:42:54.561	1	admin	interacted
2018-06-28 16:42:58.188	1	admin	interacted
2018-06-28 16:43:02.792	1	admin	answered

Fig. 2. Tabular representation of H5P interaction data

Graphical representation of an H5P content interaction-data is present in Fig 4.

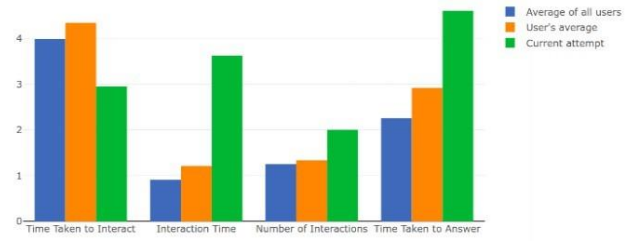

Fig. 3. Graphical representation of H5P interaction data

The graphical representation of the interaction data allows an instructor to compare the performance of a student on a particular interactive content with the performance of all other users.

This comparison can be made for the following-

1) Time-taken to interact (time difference between opening content to first interaction with the content)

2) Interaction time (time difference between first interaction and the last interaction with the content)

3) Number of interaction (How many times the user interacted with the content)

4) Time-taken to answer (time difference between last interaction with the content and submit the answer)

V. Conclusion

VizH5P is able to capture the experience data of users, and display it in a graphical and tabular manner. It provides us with interaction details, for a given h5P content, like average interaction time among users, average accuracy rate for a given question, accuracy and time spent by a user on a particular question.

I believe VizH5P services will help instructors to get an insight into their work from a user's perspective and help them to improve their content.

References

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