

## Using LAMS Version 2 for a game-based Learning Design

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**Abstract:** This article describes the use of LAMS for modelling and running a game-based Learning Design. In particular, it focuses on the new features in LAMS Version 2 (including branching in LAMS V2.1) to implement the proposed game design. The article also considers implementation issues such as monitoring of student progress, teacher intervention in student activities, and “traces” (records of student activities). The article concludes with options for rapid re-use and adaptation of the proposed game design using LAMS authoring.

**Keywords:** Learning Design, LAMS, Learning Activity Management System, games, e-learning.

**Interactive Demonstration:** Demonstration accounts for LAMS are available at <http://demo.lamscommunity.org/> - by signing-up for an account here and importing the relevant LAMS design files (via Import under the File menu under Authoring in LAMS), educators can explore, run and modify the examples given here. The LAMS design for this article can be downloaded at <http://www.lamscommunity.org/lamscentral/sequence?seq%5fid=627869>

### 1 Introduction

LAMS (the Learning Activity Management System) is a system for authoring, running and monitoring Learning Designs (Dalziel, 2003, 2005a). The most recent version of LAMS as at July 2008 is LAMS V2.1, which includes all the features of LAMS V2 (released in December 2006) together with many new features, especially branching (Dalziel, 2007). LAMS is freely available as open source software (LAMS, 2005). LAMS V2 can export designs in both LAMS and IMS Learning Design (IMS, 2003) Level A formats.

This article discusses the use of LAMS to model and run a team-based astronomy game Learning Design for school students (Martel, Vignollet & Ferraris, 2006). The initial modelling was based on LAMS V1, followed by discussion of new functions for modelling in LAMS V2.0 (which allows teacher allocation of students to groups “by hand” at run-time, as well as rich media editing for all tools) and LAMS V2.1 (which allows for branching to “private” areas based on teacher allocation, or other information, such as student voting on which team they wish to join).

The paper also discusses how teachers can observe student progress at run-time (and intervene in student discussion where appropriate), student “traces” (ie, records of activity) and the potential for rapidly changing the Learning Design to illustrate re-use/adaptation.

Learning Designs authored in LAMS can be exported as complete “ready to run” files. The LAMS Community is a global community website for LAMS users to discuss the use of LAMS and to share LAMS Learning Design files (or “sequences”, see Dalziel, 2005b). A screenshot of the sequence repository from the LAMS Community is shown in Figure 1.

LAMS SEQUENCES				
Search   My Sequences				
Public Sequences (14 sequences) <a href="#">View All</a>				
Title	Ratings	Downloads	Author	Date
<a href="#">History of Electricity</a>	★★★★★	41	<a href="#">Debbie Evans</a>	21-May-2006
<a href="#">Displaying...</a>	★★★★★	9	<a href="#">Jun-Dir Liew</a>	4-May-2006
<a href="#">Mural Design</a>	★★★★★	88	<a href="#">Andrew Lovell-Simons</a>	2-Feb-2006
<a href="#">Choosing a Mobile TV</a>	★★★★★	150	<a href="#">Donna Gibbs</a>	5-Dec-2005
<a href="#">Creative writing_place</a>	★★★★★	237	<a href="#">Robyn Phillip</a>	24-Nov-2005
LAMS @ MQ (1 sequence) <a href="#">Add</a> <a href="#">View All</a>				
Title	Ratings	Downloads	Author	Date
<a href="#">Managing Community</a>	★★★★★	7	<a href="#">Angela Voerman</a>	11-Oct-2005
Getting Started (2 sequences) <a href="#">Add</a> <a href="#">View All</a>				
Title	Ratings	Downloads	Author	Date
<a href="#">Workshop Discussion 2</a>	★★★★★	11	<a href="#">Karen Baskett</a>	2-Mar-2006
<a href="#">Introductions</a>	★★★★★	102	<a href="#">Karen Baskett</a>	21-Sep-2005
Higher Ed & Training (22 sequences) <a href="#">Add</a> <a href="#">View All</a>				
Title	Ratings	Downloads	Author	Date
<a href="#">TIP Stats Course -...</a>	★★★★★	61	<a href="#">Bilal Barakat</a>	19-Oct-2005
<a href="#">TIP Stats Course -...</a>	★★★★★	18	<a href="#">Bilal Barakat</a>	19-Oct-2005
<a href="#">TIP Stats Course -...</a>	★★★★★	4	<a href="#">Bilal Barakat</a>	19-Oct-2005
<a href="#">TIP Stats Course -...</a>	★★★★★	10	<a href="#">Bilal Barakat</a>	19-Oct-2005
<a href="#">TIP Stats Course -...</a>	★★★★★	9	<a href="#">Bilal Barakat</a>	19-Oct-2005

Figure 1: Example of the sequence repository for sharing Learning Designs from within the LAMS Community

## 2 Proposed Learning Design – astronomy game

The proposed Learning Design for modelling is a game where students work in two teams to determine the names of planets and their order from the sun. The first team can determine the order of planets (together with some other properties) based on an expert interview. The second team can determine the names of the planets (together with some other properties) from a different expert interview. After reviewing their team's "private" information, the teams then need to interact to share information to determine the overall names and order of planets. Students finish the Learning Design by completing a quiz to test his/her knowledge of the names and order for the planets.

In terms of implementation, it is assumed that the Learning Design system will provide access to two expert interviews (one for each group) as resources, two chat rooms (one for each group) for group discussion, a discussion forum for all students (in which the teacher can participate) and a quiz to finish the Learning Design (completed individually by all students).

## 3 Modelling and running the task with LAMS V1

On initial review, LAMS V1 can model and run this sequence. The educator uses LAMS Authoring to create a sequence of tools, in order, as follows:

1. "Grouping" tool – set to divide students randomly into two groups
2. a pair of "Share Resources" tools named according to the groups, and incorporating the relevant expert interviews and any other content resources. The two tools would be combined within an "Optional activities" box with instructions to students to view only their group's resources.

3. a pair of “Chat” tools named according to the groups, and combined within an “Optional activities” box as for (b) – each chat tool is intended for intra-group discussion.
4. a “Forum” tool available to all students (ie, both teams), including questions to encourage discussion between the groups. The teacher should also be able to participate in the discussion at run-time to help guide students or comments on misunderstandings.
5. a “Multiple Choice” quiz tool in which each student answer quiz questions to identify the planet name/order, and then receives a score and feedback on his/her answers

To author and run this LAMS sequence with a class would take approximately 15 minutes for an educator with basic familiarity with the LAMS software. A screenshot of the LAMS V1 Authoring environment for the sequence of activities described above is provided in Figure 2.

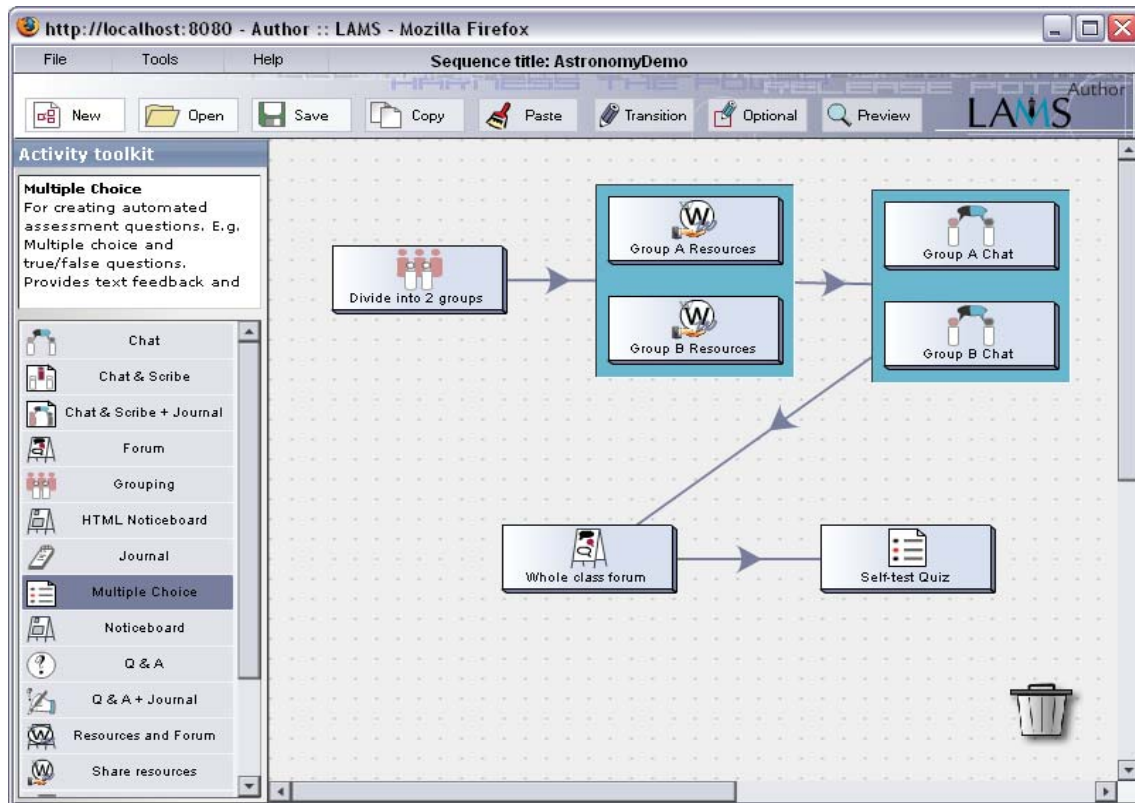


Figure 2: Example of sequence of activities in LAMS V1 Authoring

Once the sequence above has been authored in LAMS, it can be “run” with students by assigning a pre-configured class to it through the Monitoring environment, and then providing each student with access to the Learner environment to complete the sequence (by logging in using a name and password provided to access LAMS). To assign the class, the teacher (or a systems administrator) needs to have first created the class group containing the relevant students. An example of a sample student environment for this sequence (using LAMS V1) is provided in Figure 3, and an example of one of the teacher “Monitoring” screens (using LAMS V1) is shown in Figure 4.

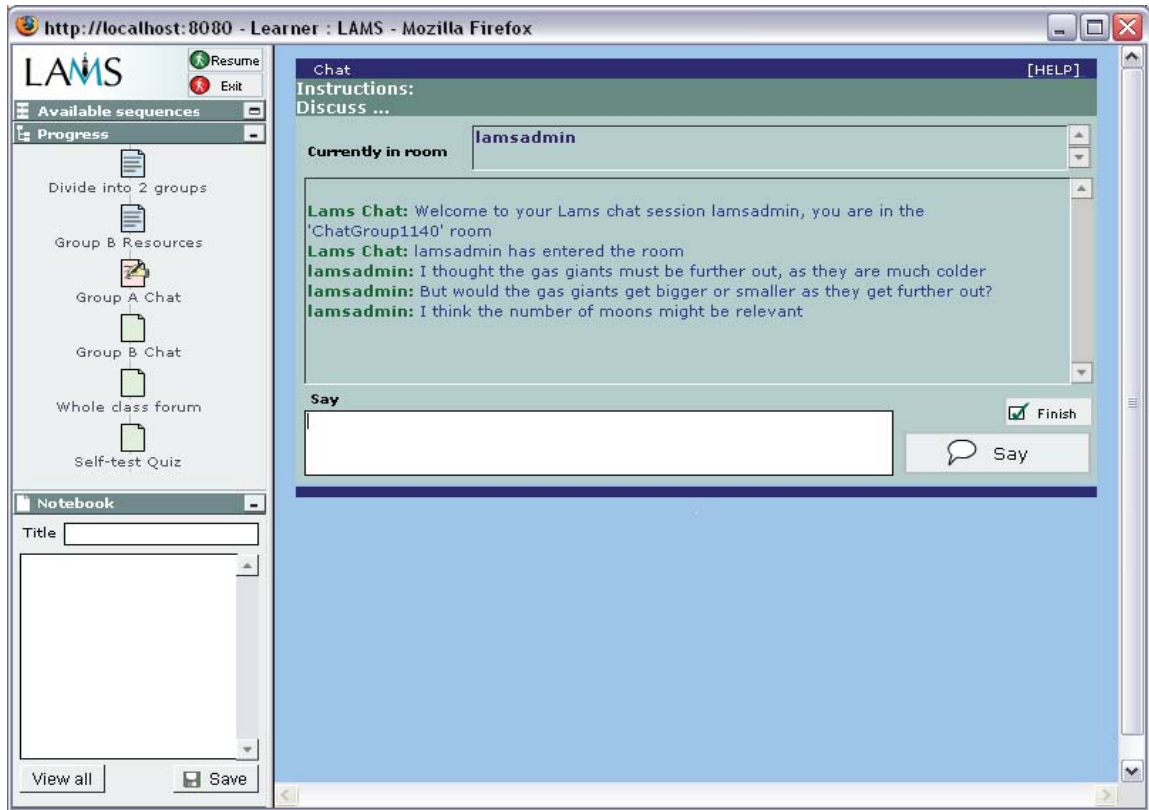


Figure 3: Example of the LAMS V1 Learner environment (showing the Chat activity)

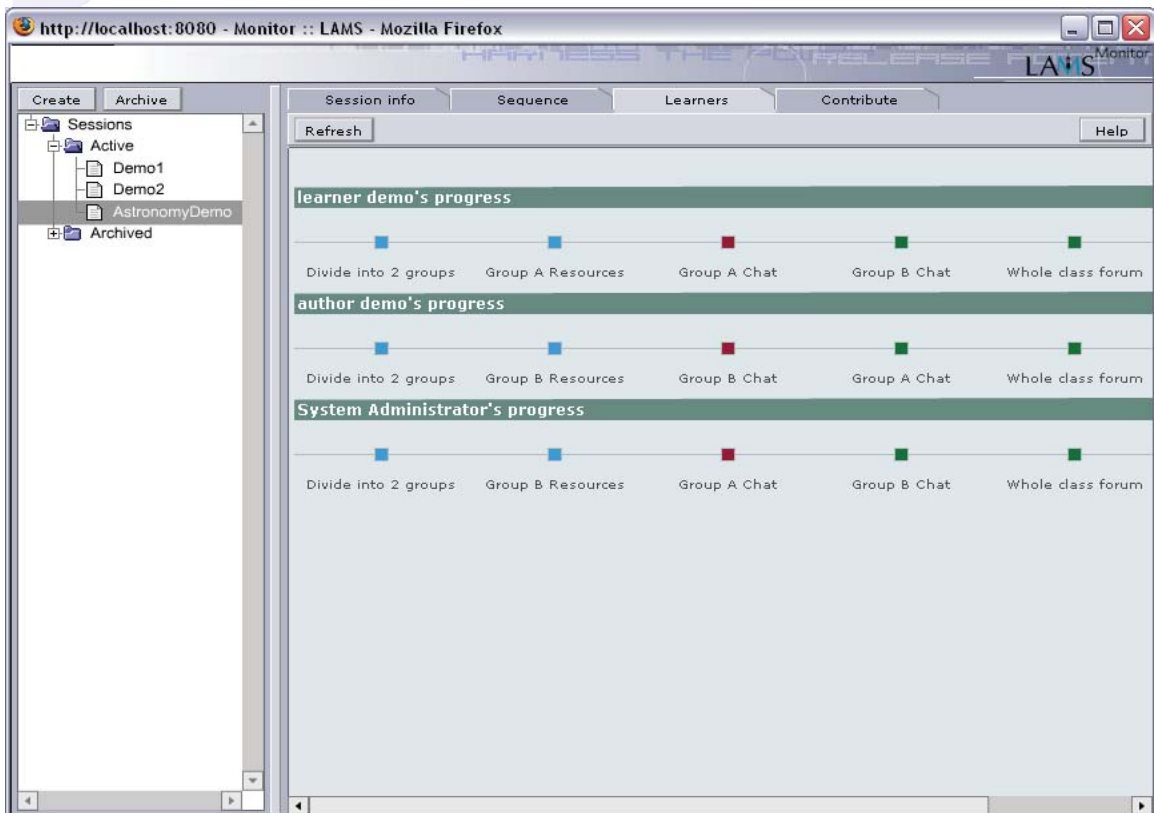


Figure 4: “Learners” tab from the teacher Monitoring area of LAMS for a live view of a sample class of three learners (using demonstration account names of “learner demo” “author demo” and “System Administrator”)

## 4 Issues with LAMS V1 approach

Despite the implementation demonstrated above, there are a number of issues worth considering further:

- LAMS V1 can only allocate student to groups on a random (not teacher-specified) basis.
- LAMS V1 can provide text instructions about which resource tool and chat tool are intended for use by student from the relevant group, the system does not enforce access to the relevant tools – students are able to enter the other group’s resource/chat (NB: a record of this action is kept and is viewable by the teacher).
- For the teacher to be able to participate in the forum in LAMS V1, the teacher must be included as a “student” within the class group – there is no automatic feature that ensures that teachers can participate in any task in a sequence that they are monitoring.

One solution to the issues identified is to run the game as three separate (but related) sequences. Sequences one and two would contain the expert interview and chat session for each group respectively. After completing the relevant group sequence, students would then access sequence three, which would contain the forum and quiz for all students. In terms of implementation with students (and Monitoring), the teacher/system administrator would create three different “classes” containing the relevant students, and apply these as appropriate to the sequences. This approach solves all the issues identified above, but results in more than one sequence.

## 5 Solutions provided by LAMS Version 2

In LAMS V2 (LAMS, 2006), all of the above issues can be solved within a single sequence (rather than needing to create separate sequences as described above). LAMS V2.0 allows teachers to specify which students are allocated to specific groups (rather than only random allocation as implemented in LAMS V1). LAMS V2.0 also allows a teacher to participate in any activity regardless of whether they are a “student” in the relevant class assigned to the sequence.

However, it was not until LAMS V2.1 and the introduction of the “Branching” feature, the different resources could be provided to different students, with LAMS enforcing the “private” resource areas for each group. There are three types of branching supported in LAMS V2.1, each of which could be used in the current context as follows:

- “Teacher allocated branching”: The teacher could simply allocate individual students to the relevant branch corresponding to the resources for the student’s team
- “Group-based branching”: The teacher could allocate students to groups at the start of the sequence, and then the branches could be based on group membership. In the current case, this is similar in effect to “teacher allocated branching”; but in other contexts (eg, where multiple branching activities are used) it may be easier to allocate students to a group at the start, rather than hand-allocate at each branching point).
- “Learner-output branching”: The teacher could use outputs from previous tools to determine the appropriate branch for students. While this is most commonly implemented with quiz scores (where students who achieve a certain score go down one branch, whereas a different score leads to a different branch, and so on), LAMS V2.1 can also use outputs such as the number of Forum postings and complete of certain tasks from a task list. It can also use Voting choices, which could be used in this case to give students a “choice” of which team they want

to join, and then use this “vote” as the basis for future branching to the relevant team resources.

Figure 5 gives an example of the structure from the LAMS V1 example, but using Group-based branching. The detailed branching screen is shown in Figure 6; and mapping of groups to branches is shown in Figure 7.

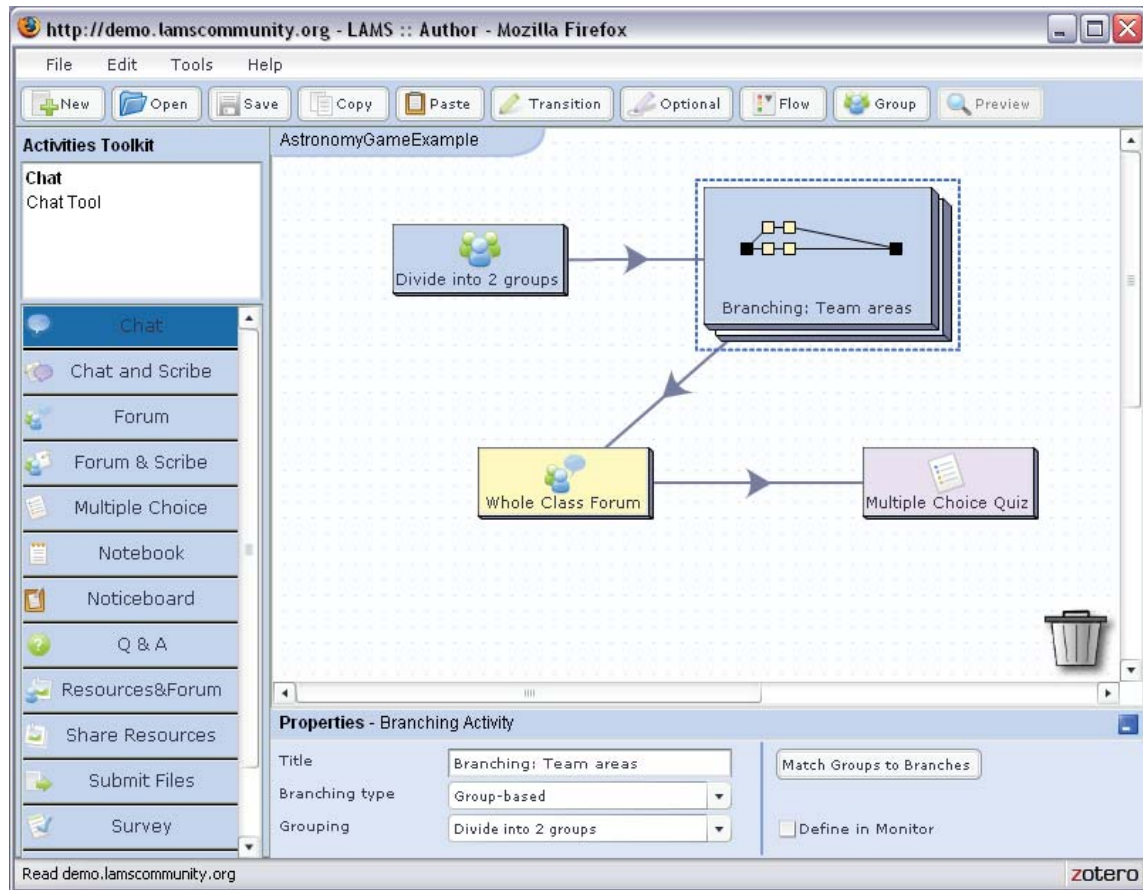


Figure 5: Authoring of Learning Design using LAMS V2.1 (including Branching) – Properties for Group-based Branching shown at the bottom of the screen

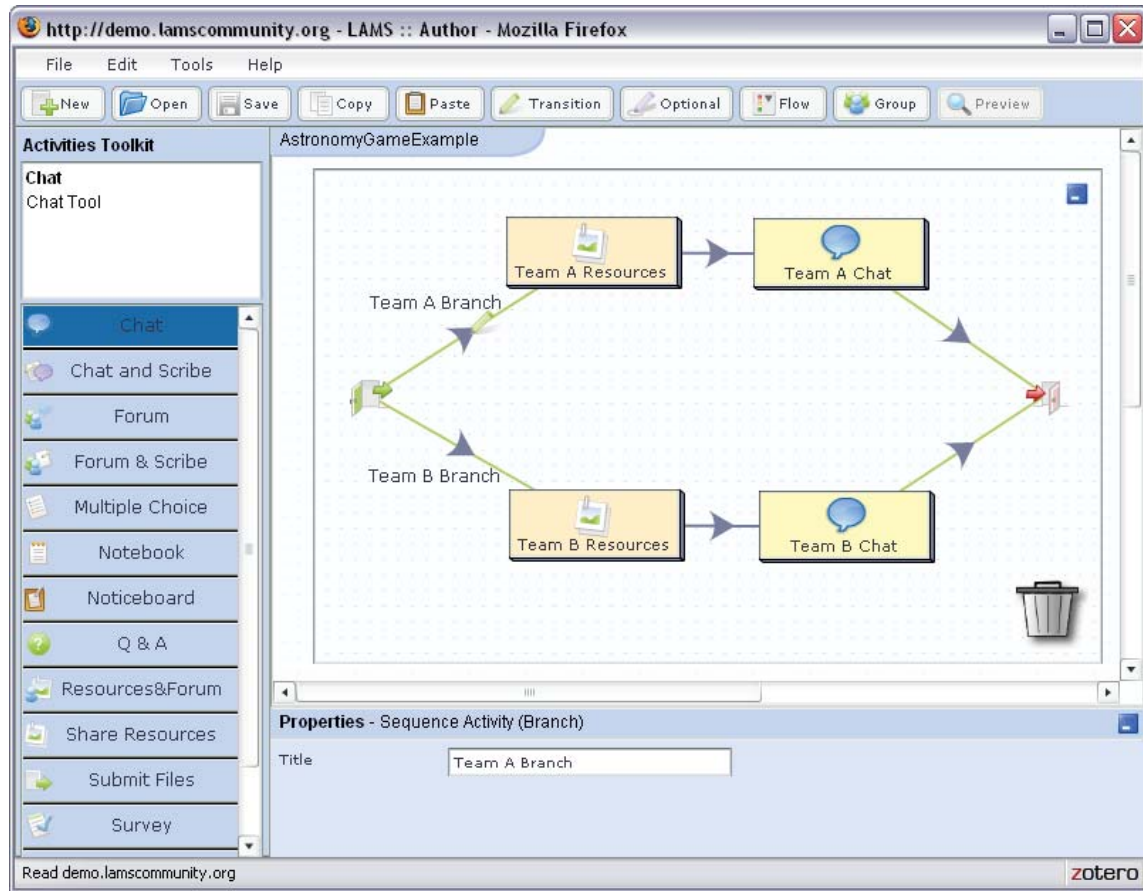


Figure 6: Detailed view of Branching from within LAMS V2.1 Authoring example in Figure 5 (the detailed Branching view is opened by double clicking on the branching icon in the Figure 5 view)

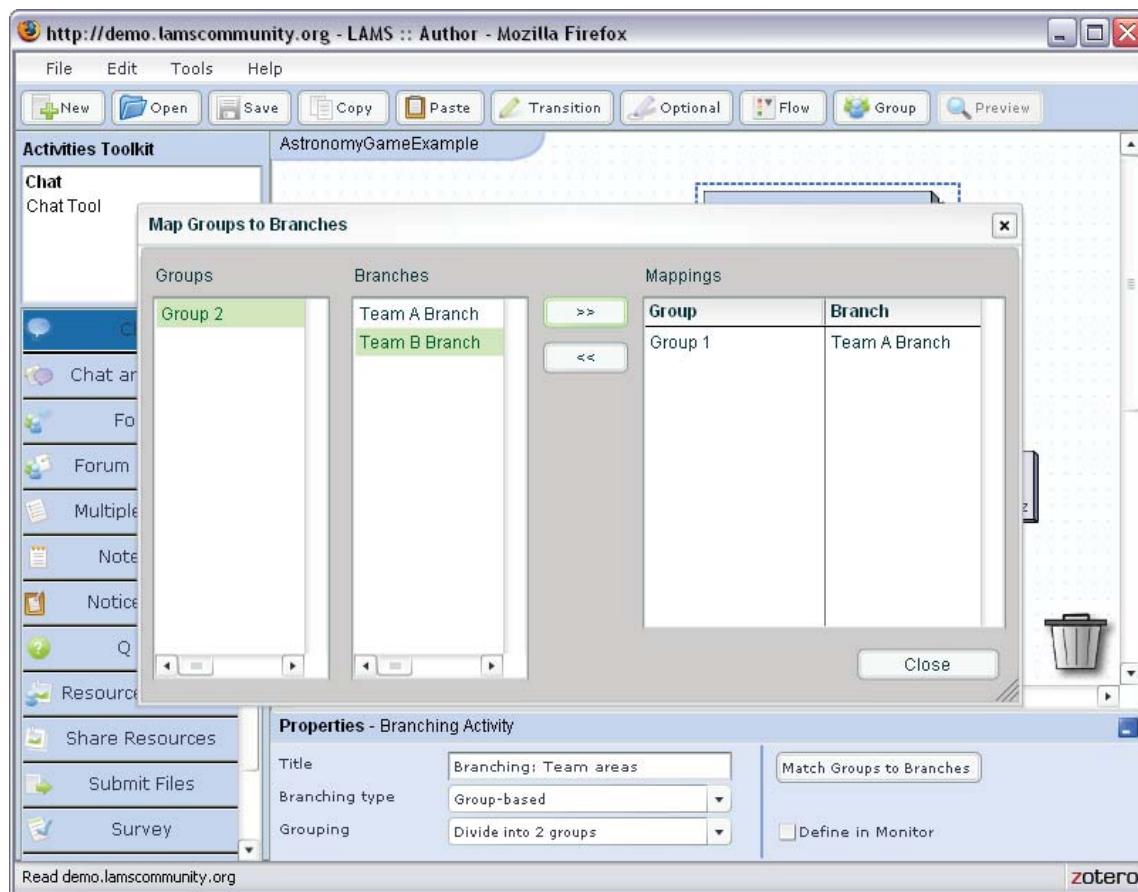


Figure 7: Example of “Match Groups to Branches” screen showing Group 1 already mapped to the Team A Branch, and Group 2 about to be assigned to the Team B Branch

## 6 Integrated LAMS V2 with Learning Management Systems

The Learner and Monitor pages for LAMS V2 are similar in functionality to those of LAMS V1 (shown in Figures 3 and 4) and so are not repeated here. However, the integration of LAMS V2 with various Learning Management Systems (LMS) provides an alternative to the process of class creation and assignment for LAMS sequences.

As at July 2008, LAMS V2 is integrated with Sakai, Moodle, Blackboard, WebCT, .LRN and Microsoft SharePoint (further information about LAMS integration is available at <http://wiki.lamsfoundation.org/display/lamsdocs/Integrations> ). The integration is similar in each case – for both teachers and students, it provides Single-Sign-On to LAMS from within the LMS class area (ie, no additional name and password is needed to access LAMS – existing student accounts details from the LMS are passed to LAMS in the background for account creation). For teachers, LMS integration provides additional features for access to LAMS Authoring, and most importantly, to adding a LAMS sequence directly to a LMS course page.

In Figure 8, an example of LAMS Authoring from within a Sakai course area is shown, and in Figure 9, the authored sequences is being launched in the course area. The new functionality demonstrated here (compared to the launch process for LAMS V1) is that LAMS V2 integrated with a LMS does not need to have classes separately created and assigned from with LAMS – rather, it uses the existing class of students from the LMS, and this class is assigned automatically to the relevant LAMS sequence when the sequence is launched in the relevant LMS class area.



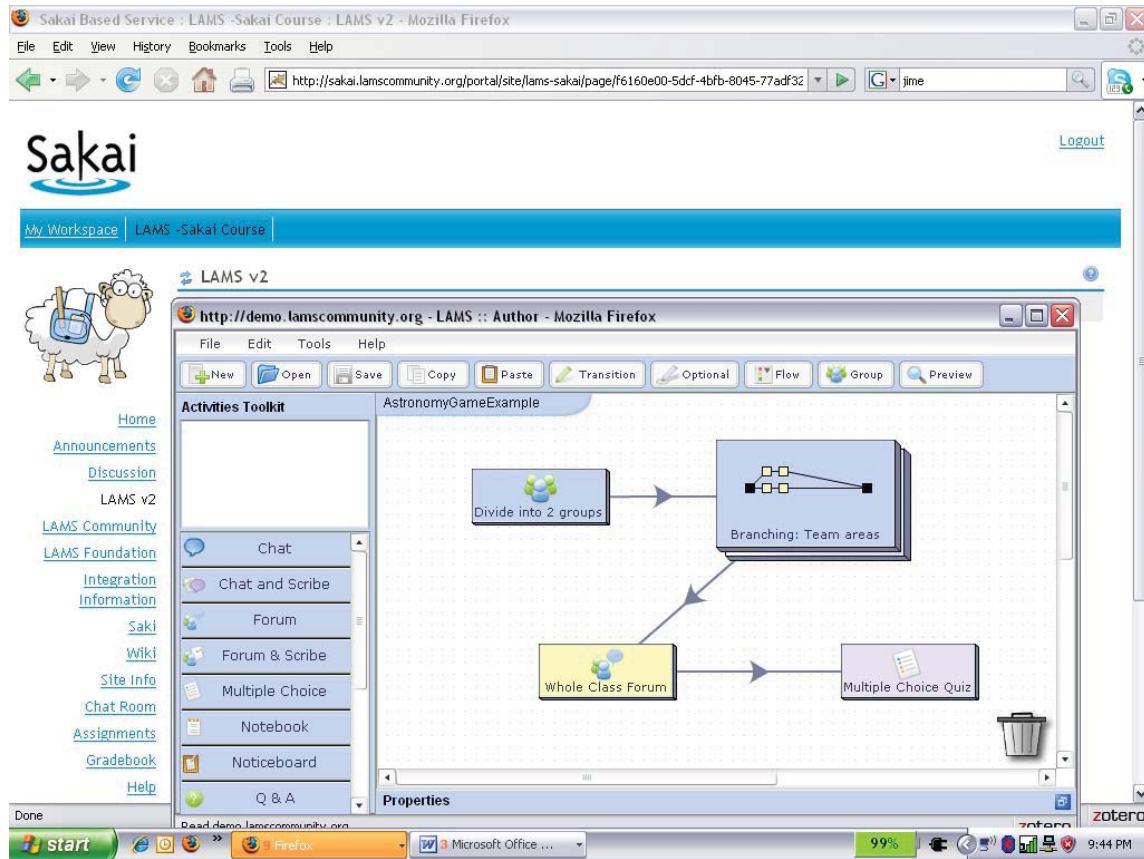


Figure 8: Example of LAMS authoring of Learning Design where LAMS has been integrated with the Sakai Learning Management System

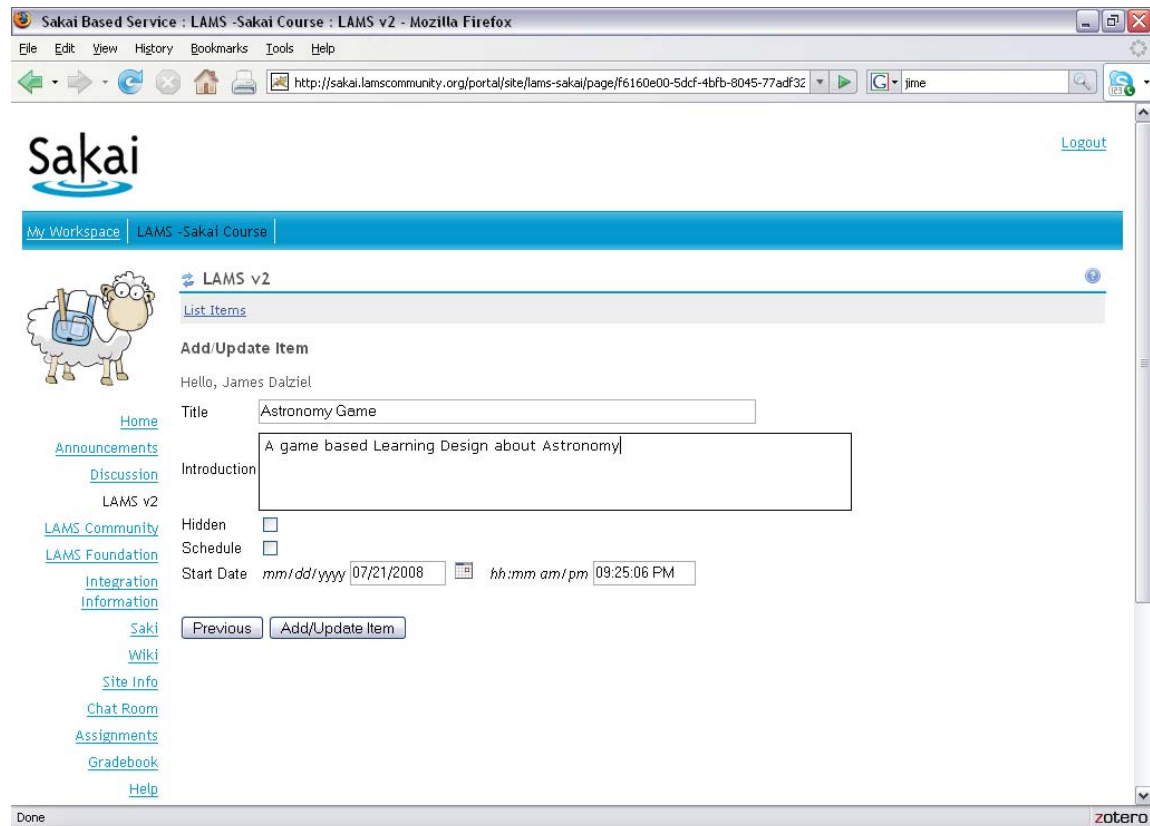


Figure 9: Launching the Astronomy game Learning Design within a Sakai course page

## 7 Observation, traces and adaptation

The LAMS Monitoring environment allows teachers to observe whole class and individual student progress in real time (for an example, see Figure 4). Whole class observation is provided through a visual representation of the sequence (based on the authoring layout) combined with icons representing the location of all students at any given moment. Individual student observation is provided via a linear display of each student's progress, with colours indicating completed tasks (blue), current position (red) and uncompleted tasks (green).

Integrated with the real-time observation features of the Monitoring environment is the ability to see student "traces" (ie, records of activity). The teacher can double click on any activity for any student to view the student's contribution to the activity (together with any contributions from other students if relevant to the given tool). In cases where students are permitted to respond anonymously to their peers, the teacher can view a non-anonymous record. Individual traces are also available to each student, who can see a record of their past activities via the progress bar in the Learner environment. In LAMS V2, students can also export a record of all activities as a static set of web pages provided in a single zipped file (called "Export Portfolio" – as this file can contribute to a student e-portfolio).

Finally, the LAMS Authoring environment provides the potential for rapid adaptation of the task described in this article. New activities can be easily added, such as additional resources to be provided after the forum, or different team-based tasks based on alternative student groups (LAMS can support multiple different groupings within one sequence). The sequence could also be adapted for a different topic, for example, the topic could be changed to a debate about whether Pluto should be designated as a planet; each group could view expert interviews either for or against this idea and debate the arguments within their group; then all students would be invited to debate the pros and cons of this idea in the whole class Forum. Finally, students could be given a voting task (rather than a quiz) to

select their personal view of the question based on the evidence and discussion. Assuming the teacher already had the relevant content resources needed for this Pluto example, it would take about five minutes to modify the original sequence for this alternative topic.

## 8 Conclusion

This article has described how a game-based Learning Design can be implemented using features from LAMS V1 and V2. A copy of the LAMS V2.1 file (shown in Figure 5) can be downloaded from the LAMS Community sequence repository – see <http://www.lamscommunity.org/lamscentral/sequence?seq%5fid=627869> NB: Downloading may require creation of a (free) account on the LAMS Community.

This file can be imported into any LAMS V2.1 (or higher) Authoring area to be explored, run or modified. For a (free) demonstration account of the current version of LAMS, sign up at <http://demo.lamscommunity.org/> This account can be used to import the downloaded file via the Import feature of the File menu in the Authoring area. For an animation of the use of the Import feature in LAMS, see <http://wiki.lamsfoundation.org/display/lamsdocs/Importing+and+Exporting+Sequences>

This article illustrates the LAMS approach to authoring, running and monitoring Learning Designs – which has a particular focus on ease of use for non-technical users, and rapid creation and implementation of Learning Design (including automatically instantiated “Learning Design aware” activity tools).

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A large, light blue watermark of the JIME logo is centered on the page. The logo consists of the letters 'JIME' in a bold, serif font. The letter 'j' is lowercase and stylized with a blue circle above it and a blue shape below it that resembles a person or a stylized 'i'. The letters 'I', 'M', and 'E' are uppercase and in a serif font. The 'M' has a blue triangle above it. The entire logo is semi-transparent.