

11-1-2005

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Recommended APA Citation

Boyes, Jim; Dowie, Sandra; and Rumzan, Ismael (2005) "Using the SECTIONS Framework to Evaluate Flash Media," *Innovate: Journal of Online Education*: Vol. 2 : Iss. 1 , Article 2.
Available at: <https://nsuworks.nova.edu/innovate/vol2/iss1/2>

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Using the SECTIONS Framework to Evaluate Flash Media

by Jim Boyes, Sandra Dowie, and Ismael Rumzan

It is easy to feel overwhelmed with the tantalizing array of instructional technologies available. How do educators choose the ones to use?

We are part of a distributed team of instructional designers, evaluation consultants, and new media specialists within the [University of Alberta](#) (Canada). Until recently, we worked together as instructional developers in Academic Technologies for Learning (ATL). Instructors often ask us what will be the best technology for teaching. The problem is that there are many factors to consider, and there typically is not one best answer to any educational situation. Without clear guidelines, popular trends can drive decisions rather than the educational appropriateness of the technology or media.

A model for the analysis and selection of technologies is provided by Bates and Poole (2003) in their book *Effective Teaching with Technology in Higher Education*. Their SECTIONS framework is particularly appealing as it considers broader organizational implications, student needs, and subject matter concerns. At ATL, we have found that instructional designers, technical specialists, and professional educators sometimes have difficulty communicating effectively about the multitude of factors that influence the design of educational resources. The SECTIONS framework provides a unified approach for individuals who have widely varying perspectives, backgrounds, and expertise. Project teams will find that the framework is both flexible and comprehensive and may be used to guide decision-making in a variety of educational contexts.

The SECTIONS framework is based on an acronym representing the criteria that should be considered when selecting instructional technologies:

Students,
Ease of use,
Cost structure,
Teaching and learning,
Interactivity,
Organizational issues,
Novelty, and
Speed.

The following article is a brief overview of the SECTIONS framework and a demonstration of how it may be used for analyzing the relative merits of a particular form of multimedia—in this case, educational resources that were developed using Flash software.

Flash: Not Just for Animations

Part drawing and animation tool and part interactive content development tool, Flash is a powerful software package developed by [Macromedia](#). During a recent project meeting of ATL, we discussed whether or not we should use Flash for a particular project. Many of us started the meeting thinking that Flash was primarily an application that would be used to create animations and dynamic entry pages for Web sites. We soon became aware that this understanding of Flash is far too narrow and simplistic.

We needed to think through if and when we would use Flash on a project. Which features of Flash would be

appropriate? We found that evaluating how we might use Flash was particularly challenging as products developed through this software range widely in complexity levels and functional features. To make the analysis more manageable, our media specialists organized the resources and objects created by Flash into five types. These types and related examples are provided in [Table 1](#). After exploring the complex nature of Flash, we applied the SECTIONS framework to assess the educational ramifications of the various types.

Applying the SECTIONS Framework

With a clearer understanding of the many ways that Flash may be used, the instructional development team had a better grasp of the various permutations that are possible. We still needed to decide when and how to use Flash. We found that the SECTIONS framework provided us with both guidelines and a common vocabulary for discussing its application within projects.

The following is not meant to be an exhaustive catalogue of all of the considerations associated with each factor related to employing Flash. Rather, our analysis of Flash using the SECTIONS framework illustrates the nature of the issues that may be examined by using this guide.

Students

Bates and Poole (2003) emphasize understanding the appropriateness of a given technology for different populations of students. In this regard, three issues must be considered: student demographics, student accessibility, and student learning styles.

In our discussion, ATL's instructional developers recognized that one of the reasons instructors value Flash is that it expands their teaching options so that they are able to accommodate different student preferences. For example, some students appreciate reading a description of the steps of a procedure in addition to seeing a demonstration. Today's undergraduate students increasingly seek the stimulation of media intensive environments when they learn as they do in other areas of their lives.

However, our staff also noted that Flash may limit accessibility to the instruction for some students. For example, early versions of Macromedia's Flash player and authoring tools did not work with assistive devices like screen readers. Even with the latest Flash plug-in, software limitations and browser issues may exist that affect the accessibility for users with visual or auditory impairments. Complex Flash objects also may require high bandwidth Internet connections to ensure manageable download times. It is difficult to give average download times because of the complex interrelationship of factors that affect the end-user's experience. For example, download time is impacted by the throughput of the Web server, the server's connection to the Internet, the number and types of connections across the Internet, the speed of the user's computer, and, of course, the actual content, including perhaps video and audio, being delivered.

Instructors and designers can increase the accessibility of a Flash object by attending to this during the technical design phase. Some design modifications can be readily implemented and should be used as part of standard practice, while others significantly increase development time and should be applied when warranted. Accessibility standards are summarized in the "Section 508 Checklist" (WebAIM, [2001](#)). Macromedia also posts [online information](#) about enhancing accessibility while employing Flash.

Ease of Use

This criterion highlights the importance of considering reliability and interface design from the perspective of the learner. For example, instructors should ensure that students are able to easily download the Flash Player plug-in. The Flash Player plug-in comes with recent versions of Internet Explorer and Netscape but may not be installed on systems using older browsers. A direct link to Macromedia's site to obtain the latest plug-in is advisable. Usability testing helps ensure that the user interface for the Flash object is intuitive; instructions or a help section may be necessary. An example from [Table 1](#) is the Department of Linguistics:

Brain and Language Assessment [Web site](#). In this example, the user is presented with a brief set of instructions upon entering the site and is able to recall the instructions at any time by clicking the question mark icon. Users also appreciate being able to easily escape animated sequences, so the option to skip the sequence should be provided.

Cost Structure

For educational resources employing Flash, there are two primary cost drivers: development time and supplementary software. Development time is determined in part by the complexity of the interaction and the sophistication of the animation. Furthermore, Flash objects may employ any of the following: graphics, animations, sound, data, and video. Developing each of these elements adds to development time. Rich Internet applications frequently employ server-side software such as ColdFusion MX and Flash Communication Server that also increase costs. Finally, because Flash is a moderately complex application, the total development time is dependent upon on the programming skills of the faculty or staff members using the software. Given the multitude of variables impacting cost, it is difficult to provide explicit cost guidelines. However, the production requirements of each project and the relative capabilities of the development team should be considered when evaluating the resource implications of a particular design.

Teaching and Learning

This aspect of the framework examines the kinds of learning required, appropriate instructional approaches needed, and media attributes necessary to achieve learning outcomes. ATL's instructional developers identified a number of ways that Flash could be used to enhance learning, including showing processes that are difficult to explain with words, illustrating trajectories in time and space, and helping learners visualize a particular motion. Flash can also be used as a way to control the display of text (e.g. fade-in or out) and to display symbols not available on the keyboard. For an illustration of this point, consider the [example](#) of Linguistics 101: Morphology Exercise for Plains Cree. In this case, special characters have been integrated into the Flash object to allow students an easy way to complete the morphemic analysis.

Novices in a subject area might have difficulty attending to relevant cues within animations, so text labels and supporting contextual information is critical in designing educational resources. As with any learning object, all learners benefit from knowing the learning objectives supported by a Flash object.

Interactivity

Bates and Poole emphasize that it is not enough merely to listen, view, or read; learners also have to do something with the learning material (2003, 98-99). Feedback is an essential element in interactivity; question and answer sequences, for example, can be incorporated into Web resources in a number of ways. Our experience has been that using Flash to build this kind of interactivity is more stable under different browsers than using alternatives such as Javascript and DHTML. MacGregor et al. (2002) put the appropriate use of Flash in perspective: With Flash, the end-user's experience is always the same—it either works or it does not (depending on whether or not the user has the appropriate plug-in), and all the logic and data-handling are contained within the Flash object. Flash also can be used to incorporate channels of interactivity and functionality such as a text panel that could be used by students to capture their notes for printing or e-mailing. One [example](#) entitled Speech Pathology Rich Media Interface incorporates the idea of a text window to allow the student to take notes and print them or e-mail them for future reference. Flash also enables the creation of simulated environments with the ability to model complex interactions and provide a high degree of user control. An illustration of this capability can be seen in the [example](#) from the National Geographic Monterey Bay Exploration.

Organization

As noted above, creating Flash objects can be a resource intensive enterprise. Bates and Poole (2003)

emphasize that it is essential that an effective organizational system be in place to ensure that a particular media or technology is both feasible and practical. For example, one strategy that ATL uses so that we may serve as many clients on campus as possible is to focus our efforts on the creation of Flash templates that can be replicated and then embedded with text and other media by department staff for particular courses. Prior to developing the templates, ATL must ensure that the instructors have adequate, skilled technical support to do this work. If the Flash templates involve complex animations or video channels, the resources have sometimes not been developed beyond the prototype stage. An example of the successful deployment of templates used within a Flash object is represented by the [example](#) from Linguistics 101: Morphology Exercise for Plains Cree. Exercises based on other languages can be easily created without knowledge of Flash by populating a companion template file that automatically creates a new page within the Flash object.

Novelty

Bates and Poole (2003) admit that novelty is one of the least important factors in the SECTIONS framework. Nonetheless, we all enjoy a change of pace. Flash objects can offer a welcome relief from instruction that relies heavily on text. Our group also noted that younger students are used to a high degree of visual stimulation and would likely welcome resources using Flash.

Speed

Some technologies require more time to implement and update than other technologies. For example, it usually is easier to create and change a Web site than a videotape. Educational resources employing Flash are typically more time-consuming to produce and more difficult to modify than HTML pages. However, if XML templates are developed to provide a user interface for instructors, content can be readily changed within the Flash object by simply editing the companion XML file. A good [example](#) of this type of design methodology can be seen in the Speech Pathology Rich Media Interface. The screen shots show an example of both a populated Flash object and the companion XML file as well as the empty framework which can be quickly and easily populated without any special expertise.

ATL staff found that applying the SECTIONS model at the beginning of each project assisted us with deciding the features and functions that would be required in the final product. From there we were better able to determine if FLASH would be appropriate.

Conclusion

When considering the potential use of technology tools in education, project teams are often comprised of instructional designers, technical specialists, faculty members, and, possibly, program administrators. These people typically have widely varying kinds of expertise and perspectives. Because of this, project teams sometimes have difficulty reaching a shared understanding of the factors impacting the design of educational resources. The SECTIONS framework provides a holistic approach that not only examines media attributes but also accommodates other key factors such as student needs, educational strategies, and organizational capacity. By applying the SECTIONS framework to guide media and technology selection at the beginning of a project, instructional development teams can approach decision-making in an organized manner while placing a high priority on learning outcomes.

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Note: This article was originally published in *Innovate* (<http://www.innovateonline.info/>) as: Boyes, J., S. Dowie, and I. Rumzan. 2005. Using the SECTIONS Framework to Evaluate Flash Media. *Innovate* 2 (1).

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