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A New Spin on an Old Classic: Effective Online Database Instruction Using the "Guide on the Side"

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A Brief History of the Guide on the Side[1]

In the spring of 2000, librarians at the University of Arizona Libraries' (UAL) reference desk were nearly overwhelmed by students seeking assistance in locating a research article. The librarian that served as the liaison to the department at that time contacted the professor to see if there was a more efficient way of teaching all the students that were enrolled in the large general education class. A decision was made by the librarian and professor to offer in-person instruction to all 150 students the following semester. The professor and librarian hoped that the in-person instruction would help reduce the number of people coming to the reference desk for help with this particular assignment and that it would ensure that all students in the class had a basic set of research skills that could guide them through the assignment. As soon as planning for the in-class instruction session began, it became apparent that finding a time and place to teach all the students the online searching skills they needed to be able to complete the assignment would be nearly impossible. The liaison librarian, the professor, and the digital initiatives librarian made the decision to experiment with offering half of the students in the class the opportunity to use a web-based tutorial instead of attending a hands-on, librarian led session. Along with alleviating some of the challenges associated with finding instructional space and time for the students, the librarians wanted to see if a web-based tutorial could be an effective substitute for face-to-face instruction. The two librarians developed a web-based, "side-by-side" tutorial, in which instructions for using a database shared the screen with the live database, and tested this method over the course of four semesters. After the testing period, the librarians determined that the tutorial was an effective method for providing information literacy instruction to large classes. The success of the tutorial in the large general education class led other librarians to adapt the side-by-side format and use it to teach students in a number of different classes including English Composition and History. The format continued to be used successfully for many years and did not undergo any major changes until 2006.

In 2006, an Undergraduate Services librarian and a programmer on the UAL's Digital Library team began looking at how the side-by-side tutorial format could be further scaled and improved. The original approach provided student instruction and feedback by having students complete a text-based web form. Once submitted, the results of the web form were routed to a librarian, teaching assistant, or faculty member (depending on the particular course) for feedback and evaluation. The person that received the form would need to evaluate the student's answers, write comments and feedback, and then talk with the student directly during an in-class session or email the feedback to the student. Although this approach was a great way to provide students with individualized feedback, it required a great deal of time of the person doing the evaluation and feedback. To make the format scalable, the librarian and programmer designed a tutorial that took a more step-by-step approach. In this version, students were guided to perform specific searches and locate specific articles. They were then asked to answer multiple choice questions and were given instant feedback on whether or not their answer was correct and why. Quiz functionality was added so that students, faculty, and librarians would have a way of assessing whether or not students had mastered the objectives of a particular tutorial.

The new format was well received by students and faculty, and librarians were pleased to have the ability to scale their instruction efforts by creating multi-use tutorials that could be used in support of student learning across a number of classes as well as at the reference desk. As librarians

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[1] See Sult (2013), for a more detailed account of the development of the Guide on the Side.

continued to find opportunities to support students through the use of the side-by-side tutorial format, it soon became clear that the UAL's programming staff was not going to be able to keep up with the demands placed on them to develop new tutorials. To address this, an attempt was made to train the project leader, an Undergraduate Services librarian, in basic programming so that she could perform some of the development work and help alleviate the burden on the technical team. Although this worked in the short term, the need to create, edit, and adapt side-by-side tutorials soon became more than the programmers and librarian could keep up with. Along with the time it took for the librarian and technical team to program new tutorials, additional pressures were created by the fact that often, the people that were developing the content for the tutorials were not the people who were creating them. This meant that each tutorial required multiple back-and-forth communications between the content creators and the tutorial builders. This took time and could become frustrating for both sides when small details were missed and new rounds of communications had to be initiated to fix the simple errors that often occurred in the process of building a tutorial.

In order to mitigate the heavy time investment necessary to build individual side-by-side tutorials, the librarian leading the project and the two main programmers worked together to design and build an administrative interface. The interface was designed to allow librarians to create and edit side-by-side tutorials independently. It was released to the librarians and staff of UAL in 2010, enabling anyone within the organization to build and edit tutorials independently. The introduction of the administrative interface has saved hundreds of hours of programming time and has allowed librarians and staff to quickly and efficiently create tutorials for a multitude of applications including general database tutorials, course specific tutorials, and staff training.

OPEN SOURCE RELEASE AND AWARDS

Once the administrative interface proved to be successful, the project lead and one of the programmers began exploring how to share the software with the wider library community. In 2012, the librarian leading the project and one of the two main programmers worked with the UA's Office of Technology Transfer to complete the paperwork to release the software as open source. As part of that process, the software was given an official name, the Guide on the Side (GotS).

Since its release in July 2012, the GotS has received considerable positive attention from around the world. Over 100 institutions have requested trial accounts. At the 2013 American Library Association Annual Conference in Chicago, GotS creators Leslie Sult and Mike Hagedon will receive two prestigious awards: the Cutting-Edge Technology in Library Services award from the Office for Information Technology Policy; and the Instruction Section Innovation Award from the Association of College and Research Libraries.

BEST PRACTICES FOR USE

The GotS software was purposefully created to be as flexible as possible so that tutorial creators would not be limited in what they could do by unnecessary technical or philosophical structures. While this approach was an important way of ensuring creativity, in some cases it lead to tutorials being created that were difficult for students to navigate, use, and learn from. To address one part of the problem, UAL librarians developed a set of design best practices to be followed by everyone within the UAL when they are creating tutorials (http://code.library.arizona.edu/gots/sites/default/files/Style%20Guide.pdf). These best practices are essential for ensuring that students have a similar visual experience across tutorials, which saves them some cognitive processing power because they do not need to reorient themselves visually when they move from one Guide on the Side tutorial to another. We strongly encourage any institution considering using the GotS to either use the UAL best practices or develop their own.

Along with the design best practices, years of experience and mistakes have helped librarians on the Instructional Services Team to identify a number of pedagogical best practices that help ensure that students are able to successfully learn from GotS tutorials. The side-by-side format that provides the foundation of all GotS tutorials allows creators to develop online learning experiences that are interactive and that require students to learn by doing. "Learning by doing is considered one of the most effective ways to learn" (Oblinger, 2007, p. 1) and even a "modest amount of interactivity can promote deeper learning" (Mayer & Chandler, 2001, p. 396) from multimedia based instruction. Working in a hands-on and active way with resources helps students retain more information than passively absorbing the same information. However, even with strong foundational principles, librarians on the Instructional Services Team found that additional pedagogical best practices needed to be identified and followed to help ensure that students were reaping all the pedagogical benefits possible from the GotS format.

GUIDING PRINCIPLES

When designing tutorials, librarians on the Instructional Services Team and throughout the library try to follow these major principles:

1. Keep text to a minimum. "On the average Web page, users have time to read at most 28% of the words during an average visit; 20% is more likely" (Nielsen, 2008). In the context of the GotS tutorials, students should be learning from what they are doing and not from what they are reading. As much as possible, reading should be used for directions and key concepts only.

2. Signal students where to start. In the context of a GotS tutorial, students are required to navigate a set

of instructions on one side of a webpage while interacting with a database or other website on the other side. Differences in database and website design can create the potential for a great deal of cognitive overload for students when they begin a GotS tutorial. One method for reducing cognitive overload is a practice known as signaling (Mayer & Moreno, 2003, p. 48). A 2001 experiment by Mautone and Mayer found that "signaling improves learner understanding" (p. 386). In 2003, in an article that examined ways to reduce cognitive overload in multimedia learning, Mayer and Moreno further asserted that "Signaling seems to help in the process of selecting and organizing relevant information" (p.48). Providing students with thoughtfully selected signals within the context of a GotS tutorial can help them manage some of the complexity inherent in learning to navigate and use online resources.

3. Use numbered steps when guiding students through a process. The use of numbered steps helps students stay oriented and on task as they work their way through a process. In their 2001 study that examined whether or not simple user interaction fosters deeper understanding of multimedia messages, Mayer and Chandler found that

> although learners may perform satisfactorily on retention tests, deep understanding (as measured by transfer test performance) may be hindered by whole presentation methods. In contrast, when the…explanation is presented part by part under learner control, the learner can strive to fully understand one segment before moving on to the next, thereby reducing the chance of cognitive overload. (p. 392)

Not only do steps help the learner stay oriented in what can be a complex visual environment, they can help learners better retain and apply information in new contexts, which is one of the highest goals of information literacy instruction.

4. Provide explanatory feedback for incorrect answers. The GotS software was developed to allow for item-level feedback for correct and incorrect answers within the instructional portion of the software. According to Clark and Mayer, "A missed question is a teachable moment. The learner is open to a brief instructional explanation that will help build the right mental model and/or correct mis-conceptions" (2008, p. 238). A study conducted by Moreno in 2004 and a follow-up study conducted in 2005 by Moreno and Mayer showed that "better learning resulted from explanatory feedback" (as cited in Clark & Mayer, 2008, p. 240). Taking the time to write succinct explanatory feedback for students when they select a wrong answer will help them better grasp and retain the skills being taught in a GotS tutorial.

5. Ask students a variety of questions. The GotS software allows creators to ask students true/false, multiple choice and short answer questions. Mixing up question types helps keep students engaged as they work their way through a tutorial. Besides ensuring student engagement, different types of questions help tutorial creators achieve different instructional objectives. For example, questions related to navigation help to verify that students are able to move around on a webpage or in a database successfully; questions related to comprehension help to ensure that students are grasping the concepts that are being taught; and questions that are evaluative in nature help students to start making their own connections to and decisions about the material they are interacting with.

6. Think carefully about where students begin a GotS tutorial. One of the UAL best practices is that all GotS database tutorials start from the Libraries' home page. This starting point was selected to ensure that students would know how to navigate back to a particular database after they had completed a tutorial.

7. Give very specific directions. Through conducting observations, librarians at the UAL have found that students perform better when they are interacting with GotS tutorials when they are given clear directions regarding how to navigate. For example, providing a direction in which a student is instructed to "click the blue search button on the upper left side of the page" yields better results than simply "click the search button". It should be noted, however, that once the specific direction is given, and the student has executed the required step, subsequent directions for the same action do not have to be as specific because students now understand what to do.

8. Develop and stick to a schedule of regular updates. This is particularly important for database tutorials since the information available in them changes rapidly. When navigation and questions become out of date, students get disoriented and the value of the learning experience becomes diminished.

DOWNLOADING THE GOTS AND WHAT THE FUTURE HOLDS

The software, sample tutorials, and all supporting documentation is freely available from this site: http://code.library.arizona.edu/gots/ . Individuals interested in examining the GotS before downloading it may also request a demo account through this site.

In the coming year, the authors intend to release a research study which examines the efficacy of the GotS format as compared to screencast tutorials. In addition, the UAL is planning to release an updated version of the software that will

address technical issues as well as issues related to the software's accessibility. We welcome any feedback librarians and instructors may have as we continue to refine this tool.

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