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Ad Astra per Aspera: Aspiring to Excellence in Challenging Times

South-of-the-Border Boolean: Teaching Search Strategies with the Value Menu

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Abstract

As databases and Internet search engines continue to become increasingly user-friendly, the need for Boolean operator skills seems to have waned but in reality, the amount of online information is skyrocketing as thousands of articles are uploaded each day. Bridging familiar activities with new Boolean operator skills sets the stage for a smooth introduction for students and creates a strong foundation for the retention of those skills. Using the simple task of ordering from a restaurant menu to demonstrate to students they already have the skills to do successful online searching, the *South-of-the-Border Boolean* lesson plan connects everyday tasks and scholarly application, while boosting confidence in students. This article will begin with a brief literature review, followed by an introduction of the lesson plan, including student learning outcomes, assessment, and unexpected results.

Literature Review

With librarians receiving less and less face time for library instruction, it is unsurprising that teaching Boolean logic has fallen to the bottom of the list of items covered in a 50-minute one-shot session. When conducting a literature review for the topic "Boolean operators" in a major library science database, the majority of returned articles were dated from before 2000. This shortage of more recent literature could be due to the simplifying of databases and search engines to make them more user-friendly, enabling the patron to conduct his or her own research without relying on librarian assistance (Proctor, 2002). However, learning styles and use of games in curriculum continue to be popular themes in the literature. Understanding different learning styles can greatly change the outcome of a lesson by delivering a message in a format that connects with students (Cuthbert, 2005). Librarians often include an overwhelming amount of information about search options and library resources in a short class period using the time-honored lecture and/or demonstration method, but may be failing to convey the information in a manner students will remember. Through repeated observations of different academic majors on campus, generalizations can be made about the learning styles preferred by certain students attracted to those majors. In this instance, previous library instruction experience with engineering and aviation students (who made up the majority of the class) held that these students generally learn best with a hands-on approach, giving students adequate information to get started but letting them explore by trial-and-error before they learned the concept. Active learning activities are perfect for students who possess body-kinesthetic intelligences, rather than traditional verbal-linguistic or logical-mathematical intelligences for which lectures and reading lessons are designed (Weiler, 2004). Even handling the physical copy of the menu or discussing options with a neighbor can help students whose learning style needs are not met with a traditional demonstration.

The literature ashows the use of games in education (in both K-12 and higher education) has become quite popular, with studies suggesting students have increased knowledge retention when games are implemented into curriculum, compared to those who used the conventional lecture style (Leach & Sugarman, 2006). Leach and Sugarman (2006) demonstrate the use of games across disciplines benefits students because instructors can "address different learning styles or preferences, provide immediate feedback, increase student motivation, and enhance a student's overall learning experience, all of which increase the chance of a positive learning outcome for the students" (p. 193). When discussing library instruction for Gen X and Millennial students, Lee (1996) recommends presenting the material in short, focused segments, using stimulating activities and providing opportunities for interaction. Not only do brief segments keep students' short attention spans from drifting, but they can provide the librarian with flexibility in the classroom, such as mixing and matching different segments to meet instructor requirements or switching to a new topic as classroom management necessitates.

Lesson Plan

Student Learning Outcomes

By using the *South-of-the-Border-Boolean* lesson plan, students learned how to effectively use the Boolean operators *And*, *Or*, and *Not* for advanced database searching strategies. They used popular Mexican foods to order from a sample menu before applying the same techniques to database searching. While a game or activity should be designed as a positive experience for students, it should also be built around student learning outcomes; they should not be forced into an activity merely because of the appeal of the activity to students. The student learning outcomes from this lesson are as follows:
By participating in this activity, students will

- Connect with the concept using current skills.
- Identify three Boolean operators.
- Apply new knowledge in a familiar setting.
- Effectively search a database using the new skills.

By using visual aids (PowerPoint slides, printed menus), auditory cues (verbal explanation of the Boolean operators, directions for the game and reading each order aloud), and letting students actively guess the correct menu item, the librarian hoped to reach the most students through different learning styles.

Activity

Aside from Computer Science majors, hardly any students are familiar with the term “Boolean operator” so the activity began with a discussion to see if anyone could name a few terms or explain what they may be used for in a research capacity. Computer Science students or advanced computer-literates often offer up technical speculations and these students were encouraged to break the concept down further for those new to the idea. For the most part, the discussion questions were met with typical blank looks, so announcing students are *already* experts at using Boolean operators, because every time they order a fiesta platter or combo meal, they are using skills that could help save them time and effort doing research, piqued their interest.

Moving ahead, students either downloaded or received printed copies of a Mexican food menu (readily available online from a dozen chain restaurants). Following along with the PowerPoint slides, students acknowledged Mexican food chain restaurants carry similar foods, generally a combination of basic staple ingredients, such as rice, beans, tomatoes and beef. These ingredients became the “keywords” in the “restaurant database” and the entrées the “articles” students would search for on the menu. The food or “article” students looked for had very specific ingredients or “keywords” when ordered. Before beginning the first order in the activity, the librarian reviewed the “ingredients slide” so students knew what the “keywords” would be for their “search.” Students were then given a Boolean combination of ingredients and asked to figure out which specific food or “article” they were trying to order (Ex. Cheese AND Beef AND Crispy tortilla shell). When looking at each “order” on the screen, the librarian emphasized the Boolean operator in each search string by reading it aloud several times, since students were looking down at their menus, instead of at the screen. The first person to identify the right menu item using the sequence of required ingredients won the round, and after the first order, students had a better understanding of how to string the ingredients together to find the particular menu item that was ordered. Taking time to review the correct choice when students questioned how that entrée was chosen was important before continuing, as well as discussing why multiple items on the menu may seem to fit the description (just as more than one article may turn up in a database search) but it may not be the correct item after a second look. At the end of the activity, the similarities between the activity and doing a keyword search were reiterated; if the student does not know how to “order” what he or she is looking for in an article by using operators and keywords, the database would not “bring” what the student “ordered” in an efficient manner.

Assessment

Two methods of assessment were used for this activity, participation during the activity and an in-class worksheet. The librarian paid close attention to the students to monitor for understanding and participation by observing how many students were attempting to answer. If some students appeared confused, or only a few attempted to respond with a guess, the class did not fully grasp the concept and the librarian restated the instructions and confirmed the directions were clear before continuing. The activity provided an outlet for the librarian to recognize when a point had been missed or was unclear. This real-time response enabled students to do their own assessment of their skills in applying Boolean logic and immediately seek help if they needed further explanation. When students demonstrated understanding of the material through non-verbal feedback, she asked students to identify the next item to be ordered in the activity.

As another form of assessment, students were asked to fill in a worksheet with Boolean search strings using their own research topics following the activity. Each student worked individually to create a list of possible keywords, then matched them together using the Boolean operators *And*, *Or* and *Not*, creating 1-3 search strings in preparation for the online database searching that would follow. The librarian moved throughout the classroom to assist students having trouble compiling a list of keywords or who required

help sequencing their selected words. After a cursory look at the worksheets, the librarian allowed students log on to the library databases to practice searching with their newly minted Boolean search strings. For formal assessment in the future, the worksheets could also be collected and scored using a rubric after students completed their research.

Unexpected Correctness

One unexpected outcome of this lesson plan was the variance of student responses when trying to guess which Boolean Operator search strings made up the desired "order." The instructor and librarian easily identified which of the "orders" was the "correct" choice, but each time students came up with creative combinations to achieve the same results, calling out different menu items that technically met the requirements. This was an unexpected bonus, allowing for impromptu discussions of how not every student searching for the same topic would go about it in the same way, but could still find relevant information for his or her assignment. The minor drawback to this outcome, however, was naming a winner of the round; the "correct" choice was often two or more items. The first time this occurred, the librarian was unprepared for this possibility, but it led into a natural discussion and the announcement of two winners.

Students were asked to provide feedback for the entire presentation at the end of the class via an online survey of nine questions. Encouraging responses included "It was a good presentation. It helped bring relevancy into searching for information," "I felt it was well worth our time" and "I liked the menu activity, it helped you relate it to real life." When asked to provide one highlight from the class they will remember, most student responses could be filtered into categories of "Boolean searching," "narrowing down searches" or "effective search strategies." These responses show that, while a few students consider the Tex-Mex menu activity to be gimmicky, it helped students recall at least some of the items covered in class regarding why Boolean operators are used and how they can be helpful to students. Because the session started with a concept they are proficient with, students' confidence was already high and using those same skills in database searching helped relieve the anxiety students had about being able to conduct relevant and efficient searches. The overall upbeat attitude of the class after the menu activity will likely lead to continued positive attitudes by building on these skills when students enter advanced writing classes.

Risking It All on a Taco

The image of the librarian, and in turn the library, is always something that is risked when entering a classroom, whether for a one-shot session or as an embedded librarian. If student feelings towards using the library and/or library materials, seeking help from a librarian, or information literacy in general shift to ones of negativity, it can seriously hamper the relationship the student has with the librarian and course instructor. He or she may be unwilling to try new tools, explore new resources, or be unreceptive to activities designed to enhance learning. Fostering good relationships is a delicate balance between giving students what they want (entertainment) and providing what they need (demonstration of library resources). The library instruction session has to be relevant, timely, and engaging for undergraduates, or they will instantly start to tune out or put up barriers.

Similarly, every librarian risks his or her reputation as knowledgeable and worthy of sacrificed class time when approaching a faculty member about piloting a new activity in his or her classroom. Each precious second of the 50-minute one-shot is scheduled tightly to meet the instructor's demands for certain items to be covered, and librarians gamble on the faculty's wrath if something is left uncovered or not demonstrated clearly. Risking a relationship built over several semesters on something that "meshes ordering Tex-Mex with finding scholarly articles" is sure to cause an eyebrow to rise so advanced preparation and thorough clarification beforehand of the benefits to the instructor is very important. However, focusing on student learning outcomes and engaging students will lead to strong Boolean skills and student success in the end.

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