Using Universal Instructional Design to Teach the Fundamentals of LIS

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ABSTRACT

As Library and Information Science (LIS) educational programs attract a large diversity of students in terms of demographics and disciplines, the Universal Instructional Design (UID) framework, with its emphasis on developing inclusive instructional methods to accommodate a multiplicity of learning styles, is advocated as a framework for teaching key LIS concepts, especially to new students.

ALISE RESEARCH TAXONOMY TOPICS

curriculum; information system design; online learning; pedagogy; students; user interfaces

AUTHOR KEYWORDS

universal instructional design; UID; universal design for learning; UDL; design principles

INTRODUCTION

In the 21st century, the Library and Information Science (LIS) field continues to expand ever wider, encompassing more and more sub-disciplines such as data science, information systems and management, knowledge management, just to name a few. One could argue that the field is expanding to reflect the myriad interests and expertise of a more diverse membership. Consequently, no longer can one assume that graduates from LIS programs will work in a GLAM (galleries, libraries, archives, museums) setting. Recognition of this reality is revealed in the changing names of programs and schools, the rise of the iSchool movement, and the more frequent abandoning of foundations courses from the curriculum. How then, especially in a student's first semester are educators to identify and define specific LIS fundamentals that are not only inclusive and relevant to the overall discipline but also speak to these diverse students with their equally diverse academic and career goals?

A possible means of achieving this important goal of inclusivity and relevance is to view curricula through the lens of a conceptual framework. In a prior paper, I argued for a Community of Practice (CoP) framework (Nesset, 2017) which advocates as an integral principle that learning is part of human nature and is "both life-sustaining and inevitable" (Wenger, 1998, p. 3). As a social theory of learning, the CoP framework integrates four main components of social participation: meaning, practice, community, and identity, with the latter closely linked to diversity. Indeed, Wenger proposes that diversity "makes engagement in practice possible and productive" (p. 75).

In this paper I present yet another potential framework – that of Universal Instructional Design (UID). Similar to a CoP setting which can "[open students'] horizons so they can put themselves on learning trajectories they can identify with" (p. 10), UID offers yet another means for achieving this goal.

This paper will provide a brief introduction to UID and provide examples of strategies within the framework to teach LIS fundamentals in ways that are meaningful to all students no matter their backgrounds. In this way, this paper connects to the conference theme, "Transforming LIS Education in an Interconnected World".

DEFINING A DESIGN FRAMEWORK: UNIVERSAL INSTRUCTIONAL DESIGN

Universal Design (UD) is an established framework used within libraries to address the need to provide physical access for disabled patrons to library facilities and services, especially in the area of technology (Hammer, 2018; Spina, 2017). However, while UD is appropriate for this physical context, it does not adequately address the educational learning environment. Universal Instructional Design (UID), or Universal Design for Learning (UDL) as it is also termed has its origins in K-12 education and the recognition that students with disabilities may require different modes of learning (Pliner & Johnson, 2004). Indeed, there is some evidence of UDL being used to inform aids for library instruction (Pionke, 2017, 2018). More recently, however, UDL/UID has broadened its scope and is grounded in the notion that providing multiple lenses through which to view a concept can be of benefit to all students (Black, Krahmer & Allen, 2018; Pliner & Johnson, 2004; Rao, Edelen-Smith & Wailehua, 2015). Thus, the term "universal" does not imply a one-size-fits-all approach but rather "an awareness of the unique nature of each learner and the need to accommodate differences, creating learning experiences that suit the learner and maximize his or her ability to progress" (Center for Applied Special Technology (CAST), as cited in Pliner & Johnson, 2004, p. 107). Building on this concept, Grier-Reed and Williams-Wengerd (2018) present three main assumptions of learning: "all students are capable of learning, students' active participation is essential for learning, and learning is an ongoing process rather than an end state" (p. 3). From a design perspective, Rush and Schmitz (2009) present for an online context seven main principles of UID along with potential strategies for achieving them (Table 1).

Fundamental UID Principles	Strategy
1. *Equitable Use:* The design is useful to people with diverse abilities (i.e., all students are unique).	Inclusive pedagogy explicitly taking into account age, race, gender, ethnic, and cultural diversities
2. *Flexible Use:* The design accommodates a wide range of individual preferences and abilities.	The design provides choice, and is adaptable to users with different abilities and learning paces.
3. *Simple & Intuitive:* The design is easy to understand by all users, regardless of prior experience, knowledge, or language skills.	The design is simple and consistent with user expectations. It addresses a wide range of intellectual abilities and language skills, providing prompt feedback after a user completes a task.
4. *Perceptible:* The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.	Different presentation methods such as pictorial and oral as well as tactile should be incorporated into the design. A range of techniques should be used when users encounter the design in order to recognize their different levels of ability.
5. *Tolerance for Error:* The design minimizes hazards and adverse consequences when a user performs accidental or unintended actions.	The design should provide warnings regarding hazards and adverse consequences and should be structured to minimize any unintended actions.
6. *Low Physical Effort:* The design is such that it can be efficiently and comfortably used with a minimum of fatigue.	The design should minimize physical effort, with reasonable operations so that users can maintain a neutral body position.
7. *Size and Space for Approach and Use*	The design allows for appropriate size and space for users so that they, regardless of body size, posture, or mobility, may approach, reach, manipulate and otherwise use it.

Table 1. UID Principles & Strategies. (Adapted from Rush & Schmitz, 2009, pp. 187-188)

While there is agreement that the main goal of UID is to allow students, no matter their differences, to understand and make sense of concepts according to their own reality, the two sets of principles presented each lack certain key elements. The learner-centered approach of Grier-Reed and Williams-Wengerd (2018) lacks detail in design. Similarly, the design-centered approach of Rush and Schmitz (2009) does not provide adequate information about the users/learners. Thus, to achieve true universal instructional design, the combination of the two approaches is necessary. It is through the application of these principles that students can be encouraged to go deeper and internalize what they are learning in a process of sense-making as outlined by Dervin (1998). The sense-making methodology advocates for the searching and using of information by the user/learner to bridge a "gappy reality". As each person's reality is different, the application of UID principles within a system, be it website or other learning platform, can facilitate the building of such bridges.

It is this broadest interpretation of UID that I advocate as a framework for LIS education to better address the disciplinary and demographic diversity of its students.

APPLYING THE UNIVERSAL INSTRUCTIONAL DESIGN FRAMEWORK: INTRODUCING STUDENTS TO LIS FUNDAMENTALS

Any instructor who has taught an introductory foundational or other core course (usually required as part of the curriculum) to students new to the LIS field and likely, new to graduate school, has experienced this broad student diversity first-hand. Often comprising a multiplicity of demographics and disciplines from the softest humanities to the hardest sciences, the one thing the students have in common is their aspiration to become information professionals. Yet even this goal can be incredibly diverse – depending on their preferences, the graduates of LIS programs will become professionals in a variety of information environments. How then does an instructor bring these new students together to harmonize their different abilities and interests rather than forcing them to conform to a certain construct? This is where UID can play a role. Below, I provide UID strategies for teaching three fundamental LIS concepts: information structure, representation, and relevance.

***Information Structure*:** As discussed in Bates' (1999) groundbreaking article, *The Invisible Substrate of Information Science*, the content of Information Science (IS) focuses on the structure of information; that the world of information is essentially the fourth universe and the intellectual domain of IS includes the production, seeking, retrieval, and use of information. Indeed, Bates (1999) stresses that, "The average person, whether Ph.D. scholar or high school graduate, never notices the structure that organizes their information, because they are so caught up in absorbing and relating to the content" (p. 1045). To help students understand this essential concept, I use the UID technique of modeling. On the first day of class, before the students have read the article, I take a straw poll. I ask the students to think back to their undergraduate studies and remember a particularly difficult assignment for which they had to do research, whether term paper or mathematical problem. Even if the course is online and students are listening to a recorded lecture I ask them to raise their hand if they ever thought about how the information that they searched

for, retrieved, and used got there? Most, if not all, do not raise their hands (of course, I cannot say for sure what happens with an asynchronous online class, but I can assume the response is similar). I then explain that this is the way it should be – that if the needed information was represented and organized in ways in which the users can each seamlessly engage in the research process, one of the most multi-faceted and important goals of the information profession, that is, the satisfaction of users' needs, has been met.

Representation: Representation is a fundamental concept in the LIS field because it requires conceptualizing ideas and transforming them into surrogates that can then be organized and made available for retrieval by users. Certainly, anything that is under study or observation can be considered a document (Buckland, 1997), but it is the representation of that document into a tangible entity, this "information as thing" that allows for retrieval (Buckland, 1991).

This understanding of representation may be straightforward, but it does not tell the whole story. I want my students to go deeper so that they understand that although objective representation is the goal, there is always a measure of subjectivity involved; that a human-generated surrogate and even those that are computer-generated are going to reflect in some way the worldview of their creators (I remind them that it is humans who program computers). To do this, I use the UID technique of visual imagery. I provide the students with different images and ask them to provide each with a caption, describe how the image makes them feel, and supply keywords. Invariably, the keywords that they generate are subjective, reflecting how the image made them feel rather than a description. For example, a picture of a blue sky with clouds in the shape of a heart is often ascribed the keywords, 'love' and 'hope'. Once they have completed this first part of the exercise, they are then asked if they think that by searching Google using the keywords they created others would be able to find the same image. Having the students think about their choice of keywords to represent an image so that it can be retrieved by others helps them to understand not only the complications associated with objective representation and retrieval, but the importance of striving to achieve it.

Relevance: Relevance is another foundational concept that I want my students to internalize and to think about more critically. Often, when discussing relevance in a LIS context, it is described in terms of ranking; in microcosm, how results are ranked in a database, and macrocosm, how they are ranked by a search engine on the Web. To explain how relevance can be subjective and is influenced by personal comprehension and interpretation, I use analogy. While giving a lecture on the subject, I indicate that I am conveying information in a way that students can understand, by speaking in English. I point out, however, that if I communicated the same information in a foreign language that no one in the class could read, write, or speak, they would not be able to understand or make sense of the information being conveyed, making the information useless to them. This helps them to realize that in order to determine relevance, one must be able to comprehend the information first. To further drive home the concept of subjectivity and interpretation, I discuss the fact that as I lecture many students take notes, and that even though each is hearing the same information, I could guarantee that no two students' notes are the same because they each interpret the relevance of the information they are receiving based on their own worldview.

CONCLUSION

Library and Information Science educational programs attract a large diversity of students in terms of disciplines and demographics. Furthermore, many of these students are seeking careers outside the more traditional GLAM environments. Universal Instructional Design, with its emphasis on creating instructional tools to accommodate a multiplicity of learning styles, has been shown to be a robust framework to teach fundamental LIS concepts such as information structure, representation, and relevance to these diverse students. UID methods help learners to more easily internalize and make sense of difficult and/or complex concepts, thus encouraging them to think more critically so as to develop more meaningful connections that will prepare them for careers within a diverse yet interconnected world.

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