



Visual Imagery Styles of Architecture Students in the Context of Library Instruction

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Abstract

Within the context of library instruction, this study examined visual imagery styles of first-year architecture students at the point of standard library instruction sessions. There are two types of mental imagery used by individuals: object and spatial. Object imaging involves forming colorful, pictorial representations of objects. Spatial imaging forms schematics of parts in relation to one another. The Object Spatial Imagery Questionnaire was administered to the students and the scores on the imagery scales were assessed. Elements of spatial and object imagery in the library instruction session were identified. The goal of the study was to determine if there were distinctive visualization characteristics among the architecture students and if those characteristics might have future implications for designing effective library instruction.

Keywords: visualization, imagery, library instruction

Introduction

Library instruction is a specialized kind of instruction to which general educational principles apply, but it is also contextualized with domain-specific content and procedures. We studied a general cognitive style, visual imagery style, in the context of library instruction. Cognitive styles are “heuristics an individual uses to process information about his or her environment” (Kozhevnikov, 2007). Cognitive styles are important to learning. For example, Thomas and McKay (2010) found that one verbalizing and two visualizing styles were predictors of comprehension from text only, text with picture, and text with diagram instructional treatments. We examined visual imagery styles because of their potential relevance to library instruction: the librarian-instructor may want to present instructional materials/activities/experiences that utilize the two visualizing styles generally found in individuals.

There are two ways in which people visualize: by forming colorful, pictorial images of objects and by visualizing and mentally transforming abstract spatial relationships between objects, as in solving some geometric problems. The first kind of visualization is object imaging. It is the kind of visualizing that artists do when vividly seeing in their mind objects (or people or nature) that they encounter or have encountered. The second kind of visualization, spatial imaging, is the kind of imaging that scientists do when they see and mentally transform spatial relationships between atoms in a molecule (organic chemistry), elements of an ecosystem (biology), or structural forces in a building (civil engineering) (Kozhevnikov, Kosslyn, & Shephard, 2005). Both types of imagery are useful and both are found in varying degrees in individuals. Some people score higher in object imagery and lower in spatial imagery; some, the reverse; and some approximately equal on both imagery scales.

The significance of the two types of imagery is not clear as of yet. For example, in a personal communication, Maria Kozhevnikov, one of the developers of the Object Spatial Imagery Questionnaire (OSIQ), said that the two traits have not yet been correlated with wayfinding activities, despite several research studies. A literature review found two applied studies of the Object Spatial Imagery Questionnaire (Woolley et al., 2007; Thomas & McKay, 2010). Woolley et al. (2007) looked at team performance of dyads composed of spatial and object visualizers. Thomas and McKay (2010) assessed the verbalizing and visualizing styles of undergraduates enrolled in a psychology class by adding the verbalizing questions to the OSIQ. They devised three instructional treatments for PowerPoint presentations on the two topics of Freud and Maslow’s theories. The treatments were text-only slides, text plus picture, and text plus diagram. They found that verbalizing scores predicted recall and comprehension in the

text-only condition; object visualizing scores predicted recall and comprehension in the text plus picture condition; and spatial visualizing scores predicted comprehension in the text plus diagram condition. Verbalizing and object visualizing interacted with treatment condition in comprehension as well, meaning that the effect of treatment condition on comprehension was moderated by verbalizing and object visualizing scores.

There have been findings about what kinds of individuals have the object and spatial imagery styles. Visual artists tend to score higher on the object scale and lower on the spatial scale; scientists, the reverse; and humanists, about equally on the two scales (Kozhevnikov, Kosslyn, & Shephard, 2005). The developers of the OSIQ later added a “verbalizer” scale, but this was not available at the time of our study (Blazhenkova & Kozhevnikov, 2009).

Our study of visualizing styles is situated in the unique domain of library instruction to first-year architecture students. As a specialized population, we wondered perhaps if there were distinctive characteristics of architecture students’ visualizing styles. In addition, we questioned what object and spatial imagery elements were present in the class. While it is too early to say that having a particular imagery style will help architecture students in various tasks like finding books within the library and navigating a web page, we can transfer concepts about the object and spatial imagery styles to the library environment. For example, we can question whether students form schematic, floor plan type images when visualizing the library building (spatial). Similarly, we can speculate whether students form vivid, colorful, detailed images of the library web page (object).

Considering the object and spatial visualization styles of architecture students can give architecture librarians some insight into their students’ minds and encourage the provision of both kinds of visual content in library instruction sessions. Students prefer the style of learning they find most comfortable and effective and their ability varies depending on these learning traits. The concept of adaptive instruction recommends tailoring instructional methods to satisfy the different needs or preferences of students. According to Jonassen and Grabowski (1993), the practice “assumes that all learners will not perform equally well given a single form of instruction” (p. 35). We suspect that the merit of providing learning content in more than one form applies to visualization styles in addition to learning styles.

The current study had two objectives:

1. Measure freshman architecture students’ scores on the object and spatial imagery scales of the OSIQ to determine the relative importance of object and spatial imagery styles in these students.
2. Analyze the content of our standard library instruction session to find elements of spatial and object imagery.

Objective 1: Methods

Since we did not know the imagery styles of architecture students, we administered the Object Spatial Imagery Questionnaire after a standard library instruction session. The OSIQ is a 30-item questionnaire with 15 object items and 15 spatial items that ask respondents to rate their degree of disagreement or agreement on a scale of 1 to 5. An example of the object visualization questions is: “My mental images of different objects very much resemble the size, shape, and color of actual objects that I have seen.” An example of the spatial visualization questions is: “When thinking about an abstract concept (e.g., a “building”), I imagine an abstract schematic building in my mind or its blueprint rather than a specific concrete building.” Eighty-four freshman architecture students voluntarily completed the questionnaire after an introductory library instruction session.

Objective 1: Results

The architecture students’ score was 3.38 on the object scale (SD=0.43) and 2.93 on the spatial scale (SD=0.43). Blazhenkova and Kozhevnikov (2009) found that a general pool of 625 participants scored 3.63 on the object scale (SD=0.62) and 2.83 on the spatial scale (SD=0.66), so the architecture scores were within the average range compared to the general pool. By comparison, 79 visual artists had a score of 4.01 on the object scale (SD=0.52) and 2.92 on the spatial scale (SD=0.65). Scientists (n=64) scored 3.23 on the object scale (SD=0.68) and 3.41 on the spatial scale (SD=.55).

A chi-square test was performed to determine if the distribution of object and spatial scores in relation to each other was as would be expected by chance. Scores were coded as high, medium, or low on each scale (category boundaries were drawn at the 33rd and 66th percentiles), and the chi-square of the contingency table was calculated using SPSS. Because the chi-square did not approach statistical significance (Pearson chi-square= 4.43, n=83, df=4, p=0.35), it can be concluded that there was no relationship in the distribution of the scores.

Objective 1: Discussion

Architecture students’ scores are average compared to the population norms. They do not show the elevated object scores of visual artists, or the elevated spatial scores of scientists. Perhaps this is surprising since architecture would appear extensively to utilize both object and

spatial visualizing. Spatial visualizing would be used in constructing building plans and arranging spaces in relation to one another. Object visualizing would be involved perhaps in the aesthetics of architectural design--choosing colors and shapes, for example. Since architecture students score in the average range for both scales, it is probably best for librarian-instructors to present instruction with both object and spatial visual elements.

Objective 2: Methods

After teaching seven introductory library instruction sessions to freshman architecture students (the sessions followed a standard outline), we wrote a description of the typical instruction, and then analyzed the content of the library instruction sessions for object and spatial visual elements. In order to identify spatial images, we looked for visual representations present in the sessions that showed spatial relations between objects or transformations of these relationships. To identify object images, we looked for representations of objects incorporating colors, sizes, and shapes. Before turning to the content analysis, we provide the context and a description of the library instruction session.

Context of the Library Instruction Session

The College of Architecture and Design is served primarily by the John C. Hodges Library, the university's central library. A subject librarian provides collection development, reference assistance, and instructional services. Library instruction has been successfully integrated into the College of Architecture and Interior Design's curriculum for many years. Architecture students immediately receive assignments requiring the use of library materials so an introduction to the library early in their studies is imperative. The Architecture Librarian provides an orientation for the students in Design Fundamentals 171 during the first four weeks of the fall semester. This introductory session includes classroom instruction and a library tour. The number of class sections each year ranges from six to nine with 15 to 20 students per 90-minute session.

The *ACRL Information Literacy Competency Standards for Higher Education* have been adapted specifically for design students (Brown et al., 2007, p. 15). It is recommended that beginning architecture students acquire the following basic skills and abilities:

- Use *Avery Index to Architectural Periodicals*.
- Use call numbers related to major fields in architecture.

- Find images and apply copyright guidelines.
- Illustrate fundamentals of visual perception and design.
- Find materials on specific buildings and architects and general concepts.
- Identify and locate appropriate print sources.
- Recognize and use discipline-specific vocabulary.

Description of the Library Instruction Session

Each library instruction session begins with a tour of the library facilities. Although many instructors prefer to bring the librarian to the classroom, we have found it necessary for architecture students to visit the physical library. Confronted with a seven-story library, three million volumes, and an unfamiliar classification system, students can quickly feel overwhelmed and defeated. The tour covers library service points on the ground through second floors including circulation, print reserves, research assistance, multimedia lab (Studio), information and referral, technology assistance, and group or quiet study areas. Basic library services are described during this portion on the tour.

The group then proceeds to the fourth floor, which houses Library of Congress classification N. Hodges Library presents a complicated floor plan (and a good study for architecture students). The elevators are located in the center of the floor with the books laid out in four quadrants radiating from the elevators. Faculty studies break up the book stacks further, dividing the Ns into three sections and the NAs into two sections. Walking through the stacks allows the students to comprehend the layout.

After the tour, the students are taken to a classroom for an orientation to the library homepage stressing links to the subject guide for architecture, contact information for the subject librarian, database resources, and interlibrary loan information. General tips on navigating the

N	4-124	A	N 8223 .R6	NA 1 .A59
NA		B	NA 1 .A6	NA 2 .A73
NA	4-125	A	NA 2 .A73	NA 12 .R65
		B	NA 12 .R65	NA 680 .H64
NA	4-126	A	NA 680 .H89	NA 737 .W7A4
		B	NA 737 .W7A4	NA 1123 .S35A4
NA	4-127	A	NA 1123 .S35C375	NA 2707 .L4A4
		B	NA 2707 .L4A4	NA 6290 .T73
NA	4-128	A	NA 6300 .B47	NA 8460 .R53
NB		B	NA 8470 .B7	NB 237 .C28S9

Figure 1: John C. Hodges Library Stacks Locator for LC Classification NA

library web pages and catalog are provided. The research process from conception to implementation is briefly introduced and the importance of evaluating sources of information is discussed.

The class is then led through a search for a specific building and its architect. The search begins with print sources. Using the library catalog, the class is shown a list of books about/by the architect and an encyclopedia that includes a substantial article on the structure. Electronic resources are then demonstrated. A search is conducted in *Grove Dictionary of Art*, as an example of an online encyclopedia. Most of the time is spent exploring the *Avery Index to Architecture Periodicals* since this will be the most heavily used resource for the students during their first year. Topics of discussion include search strategies beyond keyword searches, source availability, and the importance of proper citations. The floor is then open for questions from the students.

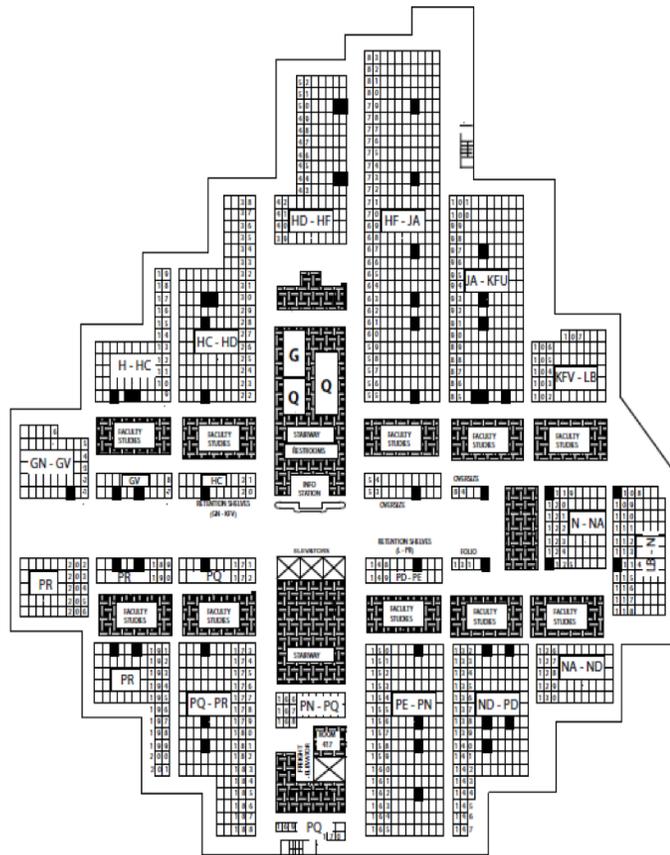


Figure 2: John C. Hodges Library 4th Floor Map

At the end of our sessions, we presented students with a paper and pencil location exercise. They were given a copy of the “Stacks Locator” (Figure 1) and a floor plan for the fourth floor (Figure 2). The goal of the task is to identify the shelf range on which a particular call number in the NAs should be shelved.

Content Analysis of the Library Instruction Session

We analyzed the instruction session into segments and assigned labels of “object,” “spatial,” and “verbal.” In order to identify spatial images, we looked for visual representations present in the sessions that showed spatial relations between objects or transformations of these relationships.

To identify object images, we looked for representations of objects incorporating colors, sizes, and shapes. Verbal elements were identified by the presence of text or speaking. Segments could be assigned to multiple categories if they utilized multiple visualizing/verbalizing styles. The results of the analysis are presented in Figure 3:

SPATIAL	OBJECT	VERBAL
Layout of first, second, and fourth floors	Appearance of service points shown on tour	Verbal explanations on tour
Print floor plan of fourth floor stacks	Appearance of library web page, catalog, other databases	Library signage
Visual structure of web pages shown	Appearance of subject librarian	Verbal explanation of evaluating sources
Stacks locator	Aesthetic features of library	Lecture accompanying demo in classroom
		Introduction to subject librarian
		General tips on navigating web pages and catalog
		Verbal content on web page, catalog, and databases
		Discussion of search strategies beyond keyword searches, source availability, and the importance of proper citations, etc.

Figure 3: *Categories of Visualizing and Verbalizing Styles*

Discussion

It was interesting to find that both spatial and object imagery elements were present in our instruction (as well as verbal, which was not measured in the OSIQ). Our results show that the object and spatial imagery concepts can be applied to the specific domain of library instruction. Library instruction apparently utilizes the imagery types of both kinds of visualizers. While some segments were easy to code (e.g., the map of the floor plan of the library, which was spatial), others required reflection. For example, it was interesting to discover that the tour included both spatial and object imagery. The layout that students would become familiar with during the tour was

assigned the spatial category since presumably conceptualizing it would entail forming a mental schematic of the parts of the library in relation to one another. We were not sure every student would form such a schematic, however. It would be interesting to study whether layout schematic images are formed primarily by students with high spatial scores, as opposed to those with lower spatial imagery scores. Regardless of what type of student forms such schematic images, the layout schematic itself is an example of spatial imagery. Object imagery present on the tour included the appearance of various service points such as the Commons and the Studio, with the memorable colors and shapes present there. (The Commons, for example, has been outfitted with distinctive decorative furniture that clearly is a source of object imagery.)

Another interesting finding was that our instruction, while including object and spatial visual elements, also had many verbal elements. We wondered how effective highly verbal instruction would be for individuals with low verbalizing scores. Blazhenkova and Kozhevnikov (2009) point out that high object/spatial/verbal scores are not mutually exclusive, but a comparison of humanities scholars, visual artists, and scientists shows that humanities scholars tend to have higher verbal scores compared to visual artists (high object/low spatial) and scientists (high spatial/low object). Therefore, those with high object or spatial skills could have low verbal scores. A future study could ascertain what portion of our students scored high on verbalizing, and what differences this would make for instruction.

Conclusion

While it is too early to link performance on library tasks with spatial and object imagery scores, it is possible to assess students' imagery scores and to analyze library instruction sessions vis-à-vis object and spatial elements. Since there is initial evidence that object and spatial imagery scores predict comprehension in text plus picture and text plus diagram conditions, respectively (Thomas & McKay, 2010), perhaps it would be beneficial for library instruction to provide text plus picture and text plus diagram materials. Our instruction differed from Thomas and McKay's in that they used PowerPoint slides exclusively with no oral instruction, whereas we used a combination of oral instruction in a classroom, a tour, and two diagrams on paper handouts. It would be interesting to find out if comprehension in oral instruction plus picture and oral instruction plus diagram conditions would also be predicted by object and spatial imagery scores.

While this was a preliminary study and additional research is necessary for confirmation of our results, our findings about the object and spatial imagery scores of architecture students provides a glimpse into their visualization processes. For example, we observed that architecture students

display a range of object and spatial visualization. Thus some architecture students may form clear, vivid images of elements such as the library entrance, while others may not. Similarly, some architecture students may form schematic blueprint-type representations of the library building, while others may not.

We also found a variety of object and spatial visual elements in our instruction session, as well as verbal content. This suggests that library instruction is already including imagery that is congruent with both visual imagery styles.

Perhaps the most important finding of this study was that the concepts of spatial and object imagery can be contextualized to the library instruction setting. Awareness of students' differing visual imagery styles can make librarians more committed to providing visuals congruent with both of these visualization styles.

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