

# The Effective Awareness Of Interior Space

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The perception of space and spatial relationships has been a concern of human development researchers for a number of years. Piaget and his colleagues (1967) note that there are three major types of perceptions of spatial relations: (1) topological — qualitative, such as, proximity and separation; (2) projective — in terms of a particular perspective, such as, a straight line; and (3) metric properties — spatial relation in a system of coordinates that depended on mathematical or geometric equality. When an individual develops spatial perception of metric properties, he or she can then focus on the organization of space and conversions of length, distance, surface and volume (Piaget, Inhelder, and Szeminska, 1960; Piaget and Inhelder, 1967). The utilization of these concepts, then, constitutes the basic component requirements of perception of an interior space.

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It has become clear that the sensation of space cannot be experienced by visual perception alone. Goldfinger (1941), a pioneer in the field, said that architectural space perception incorporates pictorial, plastic and spatial experiences. He distinguished the three by saying that pictorial and plastic experiences involve conscious perception while spatial is subconscious. This, it seems, points up the extreme complexity of the space concept itself and implies the difficulties associated with conducting research on the phenomenon.

In addition to the problems related to conceptualizing the term "space," little apparent agreement has evolved regarding the most effective techniques for communicating the meaning of space in architectural design. In analyzing interior spaces, historically it has been customary to rely on the use of floor plans. Wedin (1971) found, however, that the utility and effectiveness of floor plans for representing interior space were less than desirable, according to the Iowa architects and builders used as respondents in her study. In an effort to resolve this design controversy, Zevi (1959) and Garling (1969) each expressed a need for additional research on methods of graphic communication.

At the present time floor plans, perspectives, isometrics, elevations, photographs, and scaled models are used to represent spatial relationships within interiors. Zevi (1959) contended, however, that neither singly nor collectively could these techniques provide a true representation of architectural space. Goldfinger (1941) also commented “. . .that an individual’s imagination. . .is taxed to too high a degree when scale drawings, plans, sections and elevations have to be transformed into space.” He continued by explaining that only when the individual was within the actual space could spatial sensation be experienced.

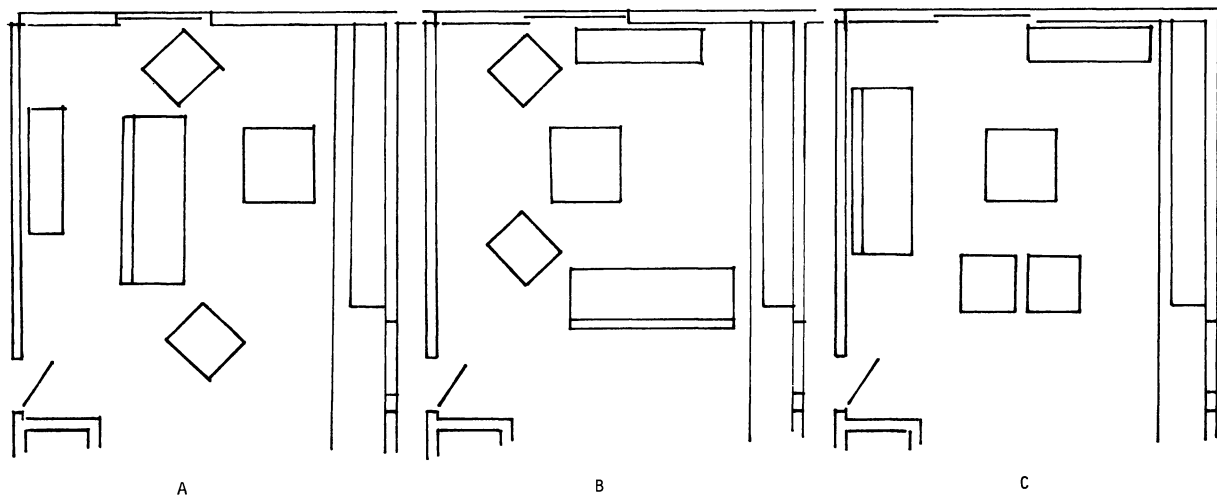
In teaching spatial relationships it has not only been costly to duplicate these exact interiors, but also inconvenient and a physical impossibility in many cases. Further, though the need for research in spatial perception has long been recognized, there has continued to be an inadequacy of appropriate testing devices which can accurately evaluate an individual’s effective awareness of interior space. Without a valid instrument with which to measure growth in judgment ability,

there is no objective means by which certain methodologies and their effectiveness could be tested.

In an attempt to minimize this deficiency, Henton (1972) developed a measuring device, the *Furniture Arrangement Floorplan Test (FAFT)* (Figure 1), to test an individual’s ability to arrange home furnishings. In 1971, Gottschalk further refined the instrument to expand its utility for evaluating the quality of teaching in academic programs which prepared students for careers in the interior design profession. Gottschalk’s study at Texas Tech University expanded the *Furniture Arrangement Floorplan Test (FAFT)* by adding the dimension of a one-point perspective graphic to Henton’s twenty plates of floor plans. The Gottschalk instrument was called the *Furniture Arrangement Graphics Test (FAGT)* (Figure 2).

The development of these instruments represented an initial contribution to space research, but at least one major question remained unanswered in their use. Do individuals perceive these two-dimensional replicas of space similarly

Figure 1.  
FURNITURE ARRANGEMENT FLOORPLAN TEST (FAFT)  
Family Area



to a three-dimensional facimile?

### The Study

The purpose of the current study was to compare the judgments of interior spatial relationships by two groups of students. One group received instruction in an interior design class by the use of two-dimensional techniques while the other group was provided with an additional experience involving a three-dimensional space laboratory. A secondary purpose which was instrumental to accomplishing the major objective was to further refine a testing device to be used as an outcome measure in the study.

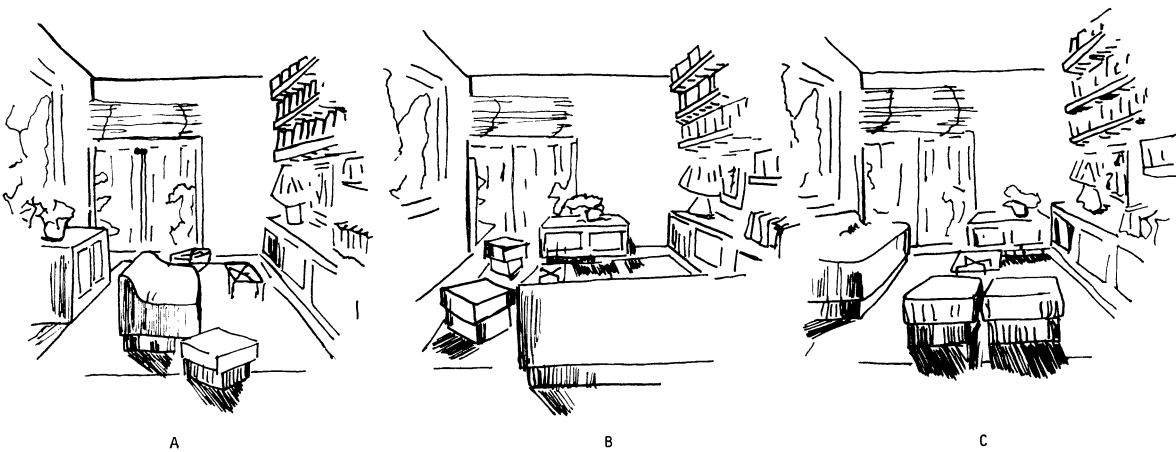
### Development of the Instrument

In order to investigate the validity of using full-scale slotted modular furniture units, instead of traditional furniture templates in teaching interior spatial relationships, the *Effective Awareness of Interior Space Evaluation (EAISE)* (Figure 3) was developed. Gottschalk (1971) suggested a combination of the best and the poorest of the

*FAFT* and *FAGT* to increase the validity but discovered that the spatial perception in the graphic view was confused by the one-point perspective since the station point was positioned to create a false glimpse of the space. It was found that the observer was not able to discriminate between the best and the poorest space knowing that they were looking through a wall, plus realization that the one-point perspective created proportion distortions of the area that was shown (Figure 4) (Henton & Gottschalk-Shannon, 1976).

The procedure used in developing the *EAISE* was an incorporation of the *FAFT* floor plans and the *FAGT* perspectives with slight modifications. A two-point perspective quick-sketch technique was used instead of the one-point perspective drawings developed by Gottschalk. The procedure provided a more clear-cut view of the given space. Past critiques of the original instrument indicated there was a need for a less cluttered appearance of the designated space. The spaces were designated as a specific area in a residence and were furnished with pieces commonly used

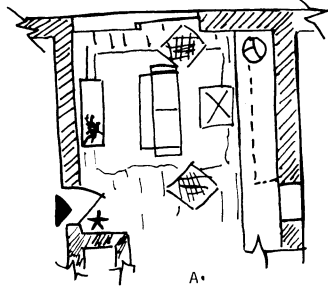
Figure 2.  
FURNITURE ARRANGEMENT GRAPHICS TEST (FAGT)  
Family Area



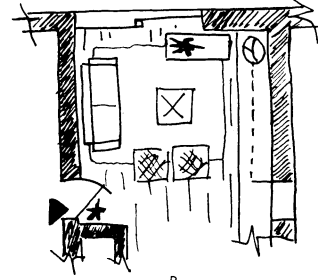


Family Area

5



A\*



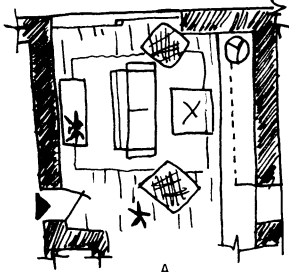
B

Figure 3

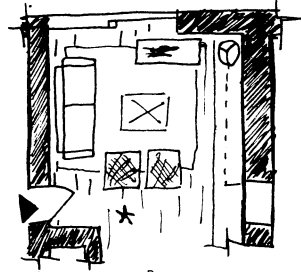
EFFECTIVE AWARENESS OF INTERIOR SPACE EVALUATION  
(EAISE)



Family Area



A



B

Figure 4

COMBINATION OF THE BEST AND THE POOREST  
OF THE FAFT AND THE FAGT

therein. Another drawing, identical to the first except for the variation in the locations of certain furniture pieces, was placed alongside the first drawing on a given plat. A total of twenty plates were prepared; however, upon recommendation from Gottschalk, the number of choices per plate was reduced. The twenty sketches were presented to each of the criterion judges who were persons experienced in interior design related fields. Revisions were performed on the perspective sketches that were not acceptable. The sketches which had been revised were readministered to each of the six judges.

#### *Procedure*

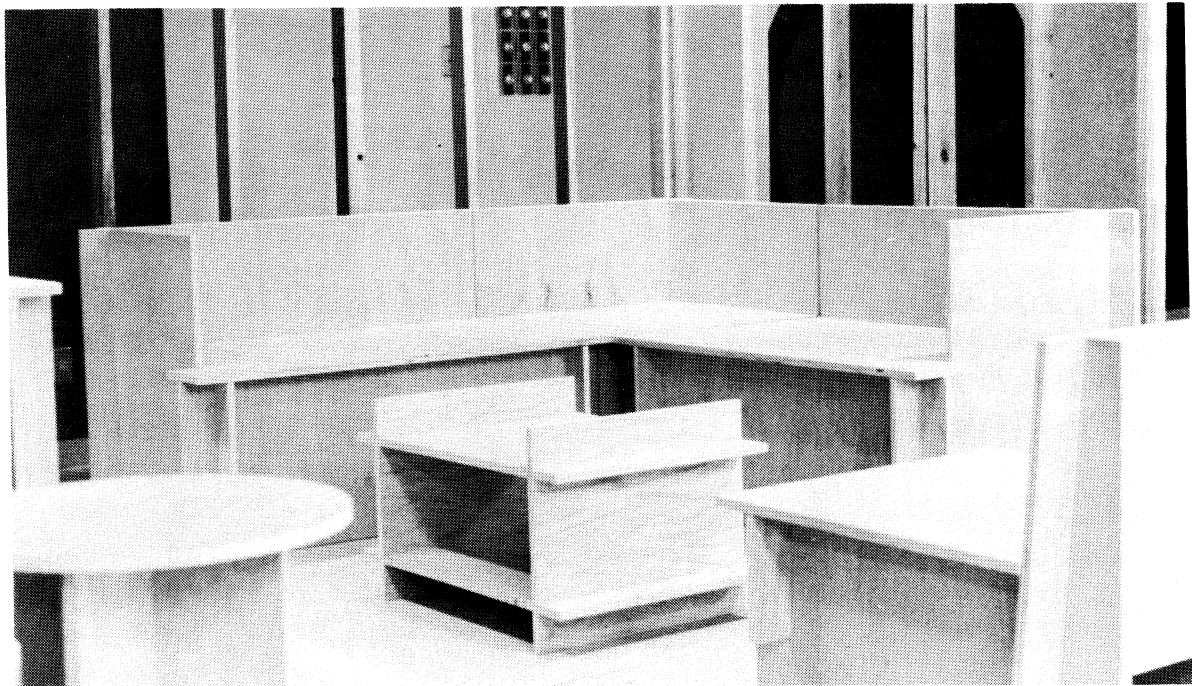
Following the completion of the *EAISE*, an experimental technique was introduced in the Home Management 330, *The Purchase and Use of Family Home Furnishings* in the Spring semester, 1976. This particular course was designed to help students to develop an awareness and appreciation of interior space and to become

sensitive to what was involved in their visual composition.

The experimental technique which the researchers employed involved the teaching of interior spatial relationships through the utilization of a full-scale, three-dimensional space laboratory (Figure 5). Modular plywood units that resembled pieces of furniture were available to assemble a variety of furnishings. Assemblage of the modular furniture was possible because of the slots cut into an individual part of a unit. The resulting furniture units were full-sized, but lightweight enough for easy manipulation.

In order to test the effectiveness of the space laboratory experience, fifty-three students who registered for the course in the spring semester, 1976, were administered the *EAISE* in a pre-test situation. The students were then randomly assigned to an experimental or a control group. The students in the experimental group spent a series of forty-minute sessions trying out ideas in the space laboratory. The control group was exposed

Figure 5.



to traditional types of classroom experiences in which equivalent periods of time were devoted to presenting the same concepts being studied in the experimental group. Following a one month period of instruction, each group was again administered the *EAISE* measurement device as a post-test evaluation. Assuming that no significant difference was found between the experimental and the control groups on the pre-test, any difference emerging from the post-test would have been reflective of the methodological treatment variation. A t-test to analyze the difference between the means of the two groups was an appropriate statistical technique. An analysis of variance was also used to detect any significant difference between the two groups over time.

### Results

The hypothesis which predicted that students received spatial relationship instruction using slotted modular furniture would score higher on the *EAISE* than students who were exposed only to traditional instructional techniques was supported. A comparison of the two groups by pre-test scores indicated that they were not significantly different at the five percent confidence level ( $t = -.06$ ,  $t_{(95)} = 1.69$ ). As a result, it was concluded that the experimental and control groups on the pre-test were essentially similar with respect to their ability to determine the affectiveness of spatial relationships before the experiment was conducted.

When the post-test data were analyzed by the use of a pooled variance t-test formula, once again no significant differences at a .05 level of significance emerged between the two groups ( $t = -1.41$ ,  $t_{(95)} = 1.67$ ), but the difference was significant at the .10 level. As there was a greater difference in the two groups for the post-test than for the pre-test ( $t = -1.41$  versus  $-.06$ ), the researchers concluded that the experimental group's higher scores may be due to different instructional techniques. Verification of this, however, can be

determined only through additional research.

### Conclusions

An evaluation of the purposes of the study supported two additional conclusions. Using a space laboratory facility with slotted modular furniture which substituted for actual pieces of furniture, was demonstrated with some measure of success in this study. A research instrument, *Effective Awareness of Interior Space Evaluation (EAISE)*, was developed with some degree of validity for the purpose of determining an ability to judge quality interior spatial relationships.

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