

Understanding Furniture Decision Making Process and Design Preference using Web-Based VR Technology

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ABSTRACT

PURPOSE AND CONTEXT

This research is a web-based investigation utilizing advanced computer/network technology in order to understand factors considered for furniture purchase and furniture style preference. In interior design, specifically for residential environments, furniture has significant meaning, not only because household furniture is the second largest portion in personal consumption expenditure following a house (Lihra & Graf, 2007; US Census Bureau, 2005; Toosi, 2002), but because furniture is a mode to project one's self-image (Altman & Chemers, 1984; Cooper, 1976). Despite the significance of furniture, little is known about different factors affecting consumers' selection of furniture and preferred furniture styles. The purposes of this research are (1) to find important features that consumers consider for residential furniture purchases and (2) to identify consumers' preferences for furniture design in terms of style, which will finally lead to a better understanding about furniture purchase behavior.

METHOD

For the current study, an on-line accessible VR integrated system VRIS was developed. The VRIS allows users to try mix-and-match combinations of furniture items from a 3D model database.

A total of 624 people, 284 males and 340 females, participated in this research. Eight possible factors of consideration for furniture choices were extracted from focus

group interviews: style, color, price, construction quality, ease of maintenance, comfort, material, and match with other items. Living room furniture models (total 117 items- 51 sofas, 38 chairs, and 28 tables) from three styles (modern, casual, and traditional) were selected by a focus group consisting of furniture marketing and design experts.

Using a series of questionnaires, participants reported 1) their perception of importance of eight considering factors in sofa, chair, and table purchases; 2) preferred furniture design options by selecting candidates for purchase; and 3) their final choice of purchase. The collected data was statistically analyzed using SPSS.

SUMMARY OF RESULTS

The results of this research demonstrated significant effects of gender and employment status (student group vs. non-student group) in considering factors for furniture purchase and style preferences. While female respondents' consistent furniture style preferences were not influenced by their employment status, males' employment status was found to have a significant effect on their style choices.

Also, results indicated that furniture purchase is more important for females and they are more sensitive than males. For sofa and chair purchases, females reported that they consider color and style more than price and construction quality. However, price and construction quality were more important over style or color for males. Results also show that females prefer traditional and casual styles.

In conclusion, as an effort to combine research and practice, we attempt to provide useful information for interior practitioners as well as the furniture industry by examining people's priority of considerations and furniture style preferences.

NARRATIVE

INTRODUCTION

This research is a web-based investigation utilizing advanced computer and network technology in order to understand factors considered in furniture purchases and furniture style preferences. In interior design, especially for residential environments, furniture has significant meaning, not only because household furniture purchase are the second largest expenditure following a house (Lihra & Graf, 2007; US Census Bureau, 2005; Toosi, 2002), but because furniture is a mode to project one's self-image (Altman & Chemers, 1984; Cooper, 1976). Despite the significance of furniture, little is known about the influencing factors of furniture selection and furniture style preferences.

The purposes of this research are to (1) find salient factors that consumers take into consideration for their furniture purchases and (2) identify consumer preferences for furniture design which will lead to a better understanding about furniture purchase behavior.

CONTEXT

Furniture occupies a significant part of every residential environment. Psychologist Carl Jung (1967) noted that self archetype can be displayed through self-expression in built form. Home, as a representative of built form, is considered an expression of self-image (Cooper, 1976).

While it is often difficult for ordinary people to own a house which reflects their own desires and hopes, furniture provides a better chance to project self-image with more options and better affordability. However, furniture is still a significant financial

commitment for most people. With its long life cycle and bulky nature, choosing a piece of residential furniture is often a challenge.

The known challenges for consumers to find ideal furniture are linked to furniture suppliers' business failures by not meeting the needs in the furniture market. Despite the importance of furniture to both consumers and suppliers, there has been little research regarding factors influencing furniture choice and shopping behaviors (Schuler & Buehlmann, 2002). Two known issues hindering researchers in furniture-consumer studies include complex factors associated with furniture purchases and difficulties in obtaining consumer feedback on furniture combinations in a real setting.

A recent study by Oh et al. (2008) proposed an innovative method to perform furniture market research utilizing a Web-based virtual reality system. Oh et al. suggested that furniture purchase experience simulated in a virtual environment can effectively map and understand consumers' decision-making processes. Virtual reality (VR) refers to real-time, interactive, 3D computer visualization technology that is known to provide the user with more engaging experiences. Previous studies established that virtual experience is vivid, involving, and active, and that affective psychological states can occur (Li et al., 2001).

METHODS

Living room furniture consisting of sofa, chair and table was studied because living room furniture accounts for the largest sector in terms of sales value (Household Furniture Market Report 2008). Among possible considerations when choosing furniture, eight factors were extracted from focus group interviews: style, color, price, construction quality, ease of maintenance, comfort, material, and match with other

items. A total of 117 living room furniture models (51 sofas, 38 chairs, and 28 tables) from three style categories (modern, casual, and traditional) were proposed by a focus group with five experts in the interior design and furniture marketing industry.

Participants were recruited via email invitation to www.vr-solution.com site. After a greeting and participant registration, they are asked to complete a series of questionnaires in one side of the Web interface. The other side has a 3D virtual showroom (see Figure 2). The questionnaires include items involving personal importance of the eight considering factors for furniture purchase in a 7-point Likert scale. VRIS has participants select furniture items in the order of sofa, chair, and table section. In each section, participants select items from a furniture list to view in the virtual room and to “save them” for review before making a final selection. The last section asks participants to choose a final furniture set after further examining the selected items together.

Figure 1. List of furniture samples

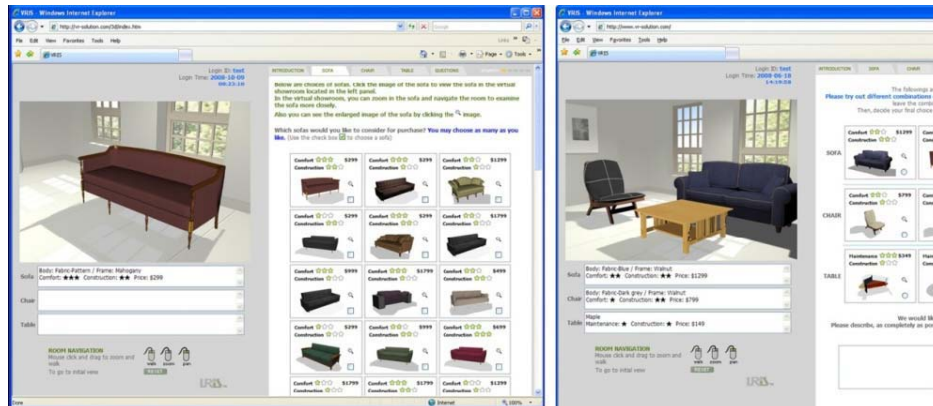


VRIS technology

For the current study, an on-line accessible VR integrated system, ‘VRIS’ was

developed. The VRIS allows users to try mix-and-match combinations of furniture items from a 3D model database. Our previous study demonstrated that user satisfaction and decision confidence with a VR system was significantly higher than when using 2D catalogue type interfaces (Yoon et al, 2008).

Figure 2. Screenshots of VRIS



Data collection and analysis

Data was collected between 2004 and 2006. Participants were invited to the VRIS site (www.vr-solution.com) and their responses were collected through the system. SPSS statistical package was used to analyze the data with multiple methods including Descriptive statistics, T-Test, ANOVA, and Cross-tabulation. Analyses were performed with alpha set at .05.

FINDINGS

Participants

A total of 624 subjects, comprised of 284 males and 340 females, participated in the research. Characteristics of this sample are presented in Table 1.

Table 1. Sample Characteristics

Demographic Variables		Average age	Total 624
Gender	Female	23.01	340
	Male	23.07	284
Employment status	Student	21.7	518 (244 male, 274 female)
	Non-student	31.95	106 (40 male, 66 female)
Age	-25		502
	26-50		114
	51-		6
Ethnicity	White		445
	African American		33
	Asian or pacific islander		56
	Hispanic		70
	Other		20

Gender & Employment Status Effects on Perceived Importance of Factors

In one-way analysis of variance (ANOVA), for all eight considering factors for furniture purchases, significant gender effects were found ($p=.05$). Females reported higher ratings than males throughout the total list of factors. Results indicated that females tend to be more sensitive to each considering factor when buying furniture than males. Importance ratings also demonstrated that furniture matters significantly more to females than males. For both male and female respondents, 'comfort' was rated as the most important factor to consider for a sofa and chair.

Additionally, females reported that color and style are more important than price and

construction quality when purchasing a chair and sofa, whereas males reported that they consider price and construction quality over style and color. Calculated standard deviations showed that female respondents have very homogeneous opinions regarding color and style.

The relationship between employment status and the perceived importance of the eight factors was investigated. Between the student and non-student group, no significant difference was found in female respondents' answers regarding considering factors. However, depending on their employment status, males reported different priorities when buying a sofa, chair or table. Overall, for the non-student group with regular incomes, mean scores of importance were significantly higher than students with the one exception of "price". However, no statistical difference between female student group and female non-student group was found.

Furniture style preference

Results demonstrated that the relationship between gender and furniture style preference. Females chose a greater number of furniture items as candidates among sofas, chairs, and tables. Also, among eight sofas (three traditional styles and five casual styles), statistically significant female preferences were observed while in three different items (one casual, one traditional, and one modern), strong male preference was observed. This shows an overall tendency of female preference for casual and traditional styles. We also found that male student group did not prefer traditional style whereas males in non-student group preferred for traditional chairs.

Final furniture selection

A Frequency Analysis displayed that casual chairs, casual sofas, and modern tables were most popularly chosen by respondents. It was also found that males tend to select more modern chairs and females prefer casual styles more.

Using a Cross-tabulation analysis, we found that the overall non-student group preferred casual styles whereas the student group preferred modern styles. There was a significant difference between the student group and non-student group among males. However, employment status did not play a significant role for females in furniture style preference.

DISCUSSION AND CONCLUSION

When considering the current decline in the furniture industry (Buehlmann & Schuler, 2001; Oh. et al., 2004), understanding consumer priority of considerations and furniture design preferences can provide useful information for the furniture industry. In addition, this study has implication for interior design research because the methods and findings can be applicable to future studies in understanding consumer decision making and design preference of furniture.

In summary, this research found several significant gender and employment status effects in furniture purchase behavior. Females' perception on the degree of importance and furniture style preference were more consistent regardless of employment status, whereas males' responses are significantly influenced by their status of employment. Also, females tend to consider furniture purchases more important than males.

Interestingly, the finding demonstrates that females consider color and style first whereas construction quality and price are more important to males. In addition, traditional and casual styles were significantly more preferred among females. Such findings can play a significant role for manufacturers and related designer practitioners by understanding consideration factors that influence consumers' furniture purchase behavior.

As an effort to combine research and practice, we attempt to provide useful information for interior design practitioners as well as the furniture industry by examining people's priority of considerations and furniture style preferences.

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