

Research on Automobile Web Page Interaction Design Based on User Experience

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Abstract:

Based on the user's experience of the car website, this paper discusses the key factors in the interaction design of the car web page, in order to provide the user with a better experience. Firstly, the author designs an interview outline based on understanding the current status of automobile web pages, conducts one-on-one interviews with users, and learns that their purpose of using automobile websites is to quickly understand the price, configuration, function, appearance and interior of automobiles. In order to further narrow the needs of users, based on the interview results, the author designed a questionnaire for automobile websites. Through the questionnaire results, it was found that users were most concerned about the functional Settings and visual feelings of cars screened by web pages, followed by the details of subsequent services and interactive operations. In order to obtain relatively scientific quantitative results, the author calculates the functions of automobile websites concerned by users according to the results of the questionnaire, takes the functional data as independent variables, and the score of webpage ranking as dependent variables for data analysis. According to the final regression analysis results, four design factors, including the top navigation bar (yes or no), the classification design of web page information (yes or no), the secondary menu of the side navigation bar of the web page (yes or no), and the car information comparison function/page (yes or no), have significant correlation with web page scores.

Keywords:

User Experience, Car Web Page, Web Interaction Design

1. Introduction

As an intelligent platform integrating shopping, consulting and service, automobile webpage has more complex functions in terms of product classification and search. First of all, the product classification of the automobile e-commerce network page needs to be diversified, so that users can choose according to their own needs. Secondly, in terms of search engines and screening criteria, automotive web pages also need to provide more comprehensive, accurate and personalized services. In

order to meet various search needs of users, some automobile websites have designed areas to screen cars in various ways, such as brand, power, driving mode, model, color, level, domestic/imported, seat number, etc. [1]. In order to create a good user experience, web projects need to increase user stickiness, what kind of interactive functions to increase, and what kind of features to create in order to better grasp the needs of users is a very important issue. Therefore, this paper extracts the interactive needs of users using automobile web pages through the results of the previous interviews, questionnaires and the analysis of automobile web page data.

2. Research Method and Process

2.1. Research method

2.1.1. One-to-one interview

The one-to-one interview method, also known as the interview method, is a basic psychological research method to understand the interviewee's psychology and behavior through face-to-face conversation between the interviewer and the interviewee [2]. In this paper, 7 interviewees were interviewed through the designed outline, and the general problems they think exist in the interaction design of automobile pages in the market now, as well as their purpose and use of browsing automobile websites were obtained.

2.1.2. Questionnaire survey

Questionnaire survey is a kind of research method to collect and analyze data, which is widely used in social science, market research, psychology and other fields. It collects information by designing and distributing questionnaires and draws conclusions through statistical analysis. Its origins date back to the early 20th century. The early questionnaire survey mainly used paper questionnaires, which were carried out by mail or face-to-face communication. With the development of computers and the Internet, electronic questionnaire survey has gradually become popular, making data collection and analysis more efficient and convenient. The advantages of questionnaire survey include the ability to collect a lot of information, save cost and time, and facilitate data analysis. However, there are some limitations, such as the possibility that respondents may have untrue answers, insufficient sample size, or subjective bias. Based on the interview results, this paper designed a questionnaire to obtain users' requirements for interactive functions of automobile websites.

2.1.3. One-way ANOVA

A one-way ANOVA analysis, also known as a one-way ANONA analysis, is a statistical method used to compare the mean values between two or more groups. It is mainly used to study the effect of an independent variable (also known as a factor) on a dependent variable. The origin of one-way analysis of variance can be traced back to the early 20th century. It was developed by British statistician Ronald Fisher in the 1920s and has become an important tool in modern statistics. In his classic book *The Design of Experiments*, Fisher first elaborated the theory and application of one-way ANOVA. In this paper, it is mainly used to analyze the difference between the data collected from the automobile website and the score.

2.1.4. Independent Samples t-test

The independent sample T test is a statistical method used to compare whether the means of two independent samples are significantly different. It was first proposed by British statistician William Sealy Gosse in 1908, and is now widely used in medicine, social science, engineering and other fields. This paper is mainly used to determine whether the partial data of the automobile website after statistics have a significant impact on the score of the webpage.

2.1.5. Correlation analysis

Correlation analysis is a statistical method used to study the relationship between two or more variables. It helps us understand the interactions between variables, the degree of dependencies, and possible patterns. The origin of correlation analysis can be traced back to the end of the 19th century and the beginning of the 20th century. The work of statisticians such as Galton and Pearson laid its theoretical foundation and became one of the important tools in modern statistics. In this topic, it is mainly used for correlation analysis of two continuous variables. If the classified data needs to be converted, the relationship between the specific values of these functions and the website score is mainly analyzed to provide quantitative basis for it.

2.1.6. Regressive analysis

Regression analysis is used to study the relationship between two or more variables. It can help us understand how one or more independent variables relate to the dependent variable and predict the value of the dependent variable. The origins of regression analysis can be traced back to the late 19th century, and the work of Galton and Pearson laid the theoretical foundation for it and became one of the important analytical tools in modern statistics.

2.2. Research processes

The research process of automobile web page interaction design based on user experience is as follows:

(1) The author conducted a one-to-one interview with users to understand the purpose and use of automobile web pages by researching relevant literature on automobile web page interaction design and combining the research methods of automobile web page interaction design. Based on the interview results, a questionnaire is designed to obtain the basic needs of users in terms of function, content and interaction when using automobile websites.

(2) Based on the results of the questionnaire, the author calculates the function data of the automobile website, and makes a comparative analysis between the function data and the website ranking. The author will count the top 50 websites in the automobile industry of webmaster home, the score of webmaster home ranking as the measurement standard as the dependent variable, the statistical functional data as the independent variable, and the website score to do data analysis, and get the design factors that users really value.

(3) Data results include numeric data and font data, text data needs to be converted into defined class data, and then analyzed after data labels are completed. The author first carried out single factor ANOVA analysis and independent sample T test on different data to obtain specific interaction design functions that have a significant impact on web page scores.

(4) The author will carry out correlation analysis on the functional data with significant differences, and finally carry out multiple regression analysis on the functional data with significant correlations to obtain the final analysis results.

3. User Demand Mining of Web Interaction Design

3.1. Interview research

The author of this interview adopts the form of one-to-one interview, including face-to-face interview and wechat interview. There are 7 people in total, all of whom have used automobile websites and are between 25 and 50 years old. Through the interview, the author can more intuitively understand the user's view of the current automobile website, and find out the basic needs of using the automobile website with them.

3.1.1. Interview outline design and process

Before the formal interview, the author will prepare the interview questions, which are divided into three parts:

(1) The author briefly introduces his own information and the purpose of the interview, and understands the basic information of the interviewees; (2) The author understands the purpose of the respondents' use of automotive websites and their views on existing automotive websites; (3) The author further understands the interaction needs of the respondents when using the automobile website, and obtains the usage needs from the perspective of users, including but not limited to the function, page layout and other elements of the automobile website.

3.1.2. Analysis of interview results

Through interviews with users, the author understands the purpose and use of users' automobile websites, and the interview results are as follows:

(1) The purpose of the respondents' use of the automotive website. Users use the automotive website mainly for the following purposes: to query information about automotive products, to compare multi-model vehicle configuration information, to understand the information of cars on sale at different prices, to understand the current price of intended cars, to view car evaluation videos, to view recent information and news related to the automotive industry.

(2) Respondents' web experience. Page layout interface information is too much, too messy, it is not convenient to find the target information, the interface is best to be clear, concise, not complex, important information to be prominent; The screening function is not comprehensive enough, the classification of automobile information should be clear and easy to find; The location of the navigation should be obvious and easy to find, and it is best to have some classification of large amount of information; Font size should be reasonable, ICONS, buttons should be easy to operate; Web response should be timely; Advertising should not affect the user's experience too much.

3.2. Questionnaire survey

3.2.1. Purpose of questionnaire survey

The author distributed a large number of questionnaires to understand the purpose and needs of users using automobile websites. The questionnaire is divided into two parts: First, understand the basic information of the user, including gender, age, education, occupation, and have a preliminary understanding of the user; Secondly, understand the purpose and main needs of users to use automotive websites, and understand users' needs for automotive web layout, navigation, functions and experience. The questionnaire was conducted in the form of online survey, and a total of 278 questionnaires were collected. In the fifth question, if the respondents chose the option of not browsing the automobile website, they would be automatically judged as unqualified questionnaires [3]. In addition to the incomplete and unqualified questionnaires, there were 256 valid questionnaires, with an effective rate of 92%

3.2.2. Summary of questionnaire results

The first part is the basic information of the interviewees. According to the valid questionnaires collected, the proportion of males was 57% (146), and the proportion of females was 43% (110). In terms of age, the largest proportion is 26-33 years old, accounting for 36%, a total of 92 people; Those aged 18-25 accounted for 31%, a total of 78 people; 34- to 41-year-olds accounted for 18%, with fewer in other age groups. Among the results of education survey, college and undergraduate accounted for the largest proportion, accounting for 63%, a total of 161 people; Graduate students followed, accounting for 20 percent, with 51 students. In the survey results of the interviewees' occupation, students accounted for the highest 36%, a total of 92 people; Company staff accounted for 22%, a total of 57 people; Freelancers accounted for 19%, or 49 people in total; Civil servants/teachers/government workers accounted for 14%, or 34 people in total; Others accounted for 8%, a total of 21 people; Retirees account for 1 percent, or three people in total.

The second part is to understand the interviewees' main purpose of using automotive websites, the factors that affect the browsing experience, and their needs for web navigation and layout. According to the results of the questionnaire survey, when users enter the page, they first pay attention to the overall aesthetics of the page, the basic function setting and design of the page, and the design of the visual interface, followed by the subsequent service and interactive operation design. The purpose of users to use the automobile website is mainly to find car information and compare the configuration information of multi-type vehicles, and it can be seen from the functional plates they often use that they mainly focus on these two items. After entering the page, due to the complex information of the car, the need for reasonable web layout and functional classification, users can better find information, and key functions need to be placed in the prominent place of the web page. The ads in the page will affect the user's experience, and need to be subtracted. In function design, the navigation bar needs function classification design, and some functions need to set two level menu classification, which is convenient for users to further filter; During operation, the interaction design needs to have reasonable feedback and response design, which can start from the aspects of color contrast and text comparison, so that users can understand the interaction behavior more clearly. The automobile information screening area needs to classify various types of automobiles in various ways due to the different usages and needs of users. The website needs a search function, which is convenient for users to search. The information sought; Users need a place for feedback or complaints, and it is also easy for the website operator to collect user comments and then contact the designer or front-end engineer.

3.2.3. Car web data statistics

According to the results of the questionnaire in the last chapter, in order to further clarify the specific operational needs and key design factors for users to use automobile websites, the author decided to collect interactive function data of the top 50 websites in the automobile industry of webmaster's home, and do data analysis with the website score, so as to obtain the design factors valued by users, and clarify the interactive function and interaction form to be set. Webmaster Home is a well-known IT Internet website, has provided services for many well-known enterprises and government agencies, such as Huawei, Jingdong, Tencent, government agencies have The State Council Cyberspace Administration, State Administration for Industry and Commerce, etc. In the field of website industry ranking has a certain authority, but also has its own advantages and uniqueness. Webmaster home industry ranking by Alexa ranking, Baidu weight and PR value of three aspects of comprehensive calculation, Alexa ranking by the number of user links and page views composed; Baidu weight is composed of page keyword ranking, website domain name registration time length, website content construction (original degree and high-quality content update), website update time; RP value mainly reflects the level of the website, there are 1-10 points, the higher the score, the more can reflect the popularity of the page, the specific composition is shown in Table 1.

Table 1. Rating components of Webmaster's home.

Webmaster Home scoring component	
Alexa ranking	User link count
	Page views
Baidu weight	Keyword ranking
	The length of time it takes to register a domain name
	Website content construction
	Website update time
Website PR value	Page level (1-10 scale)

As can be seen from Table 1, page ranking score is composed of the number of page links, page views, page content construction, page level and user satisfaction. Users will use this website more only when they are recognized and satisfied with the website. The more users use this website, the more page views, links and page levels will rise, and the page ranking will rise after the website data rises. Because these four factors account for 57% of the page ranking and scoring system, the webmaster home car page ranking reflects the user's satisfaction with the use of the car page and the use experience to a certain extent, and the user's use experience and satisfaction include interaction needs, so based on the webmaster home ranking, With the webmaster home ranking of the top website data and webmaster home website score to do data analysis, you can find out which function design, location, interaction effect is the user really attach importance to the factors, which functions of the car website, the specific design of each function is more favored by users. As shown in Figure 1.

Based on the reasoning results and the literature conclusions found by the author, Wang Zhineng discussed the impact of optimizing the elements of web design on user experience in the article Web Design and User Experience, and collected different users' feelings and evaluations on the use of websites through questionnaires and other methods [4].

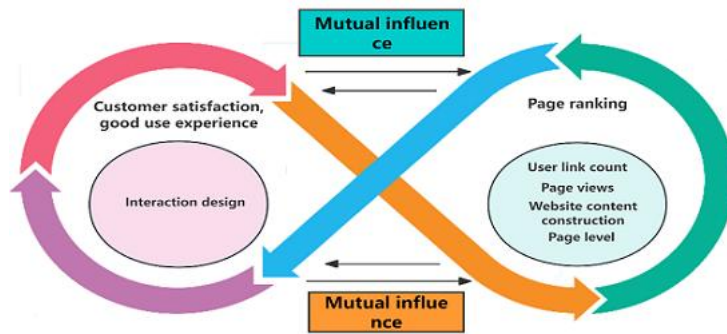


Figure 1. Relationship between webpage ranking and user satisfaction/user experience.

The study found that the navigation menu of the web page is more concise, intuitive and easy to understand, and users are more likely to find the content they want and click on it, increasing their visits to the website and page visits. Next the author statistics webmaster home car page ranking .The top 50 websites are shown in Table 2.

Table 2. Statistics of 50 automotive websites and rankings.

Website ranking	Page score	Website name	Website ranking	Page score	Website name
1	4751	autohome	26	3497	Invincible electric network
2	4740	Pacific auto network	27	3493	NetEase Automobile
3	4382	Owner's guide	28	3485	Car network Jianghu network
4	4170	Aika Automobile	29	3476	Import car market
5	4068	Pacific Motor car quote	30	3454	First car market
6	4049	Truck house	31	3431	Ehi Car Rental
7	4014	Bitauto	32	3426	Automobile consumption network
8	3933	Auto times	33	3423	O Kong Da luxury car Plaza
9	3850	Owner's home	34	3398	The World Car network
					Continued table 3.2
10	3842	Used car home	35	3393	Buycar
11	3833	Online car market	36	3381	Sina Automobile
12	3806	Phoenix auto	37	3379	Xiaopeng Automobile
13	3785	Car selection network	38	3376	Auto information network
14	3725	58 cars	39	3350	Car rating website
15	3703	Vehicle plasma network	40	3343	China Car Rental
16	3702	Guazi used car	41	3338	Global electric vehicle network
17	3646	Bull motorcycle network	42	3326	Bull car network
18	3617	First car network	43	3323	China truck network

19	3597	Huaxia used car	44	3278	Off-road e family
20	3573	Global auto network	45	3274	Jaguar China
21	3567	Tencent Auto	46	3236	Love card car selection center
22	3555	First electric network	47	3226	Uxin used car
23	3551	Car sharing network	48	3223	China Electric Vehicle Network
24	3539	Commercial vehicle network	49	3219	Sohu Auto
25	3537	Auto parts people network	50	3211	Car 300

The paper identified the top 50 automotive websites and recorded their scores, then compiled the required feature data. The data are broken down from the results of the previous questionnaire. See Table 3.

Table 3. Statistical web function data.

Functional block		Specific design details
Web function and layout		Whether the web page has information classification design
		Whether there is a car information comparison function/page
		Is there a car evaluation section
		Automobile evaluation section (position)
		News information section (position)
		Web problem feedback (position)
		The number of web ads factors
Navigation functional area	Top navigation bar	Whether there is a top navigation bar
		Whether the top navigation bar has a secondary menu
		Whether the top navigation bar has an interactive response design
		Whether there is a car information screening area
	Side navigation bar	Whether there is a side navigation bar
		Whether there is a side navigation bar secondary menu
		Whether the side navigation bar has an interactive response design
Search information area		Search bar (position)
		Whether there is a search bar response border

As shown in Table 3, after statistical data, the author used SPSS26.0 software to make data analysis of 16 functional data and website ranking, and sorted out the relationship between each data and ranking.

4. Demand Analysis of Automobile Web Page Interaction Based on User Experience

4.1. Web layout and important function section analysis

4.1.1. Whether the web page has information classification design analysis

The author sorted out the data of 50 automobile websites with or without information classification design and found that 33 websites had information classification design and 17 did not. After the data variables were unified, the data was brought into SPSS 26.0 for data analysis. * means significant difference at the 10% level, ** means significant difference at the 5% level, and *** means significant difference at the 1% level.

Table 4. *There are no Independent Samples t-test for information classification design and web page score.*

	Whether there is information classification design in the web page(Mean value±Standard deviation)		<i>t</i>	<i>p</i>
	no(n=17)	yes(n=33)		
Site score	3390.00±111.05	3722.85±386.92	-4.588	<0.001***

From Table 4, we can see that there are significant differences in the score of web pages with or without information classification design ($p < 0.1$), the presence or absence of information classification design has a significant difference in website score at 0.01 level ($t = -4.588$, $p < 0.001$).

Through comparison and difference, we can see that the average score of web pages with information classification design is significantly higher than that of websites without information classification design. The next step is to conduct correlation analysis

Table 5. *Whether the web page has the correlation analysis results of the information classification design.*

Whether the web page has information classification design		Site score
	Correlation coefficient	0.447***
	<i>P</i> -value	0.001
	Sample size	50

We can see from Table 5 that there is a significant correlation between website information classification design and website score (ranking). ** indicates a significant correlation at 10% level, * indicates a significant correlation at 5% level, and *** indicates a significant correlation at 1% level. The correlation value between website score (ranking) and webpage classification design with or without information is 0.447, showing a significant correlation ($p = 0.001$), indicating that there is a significant positive correlation between webpage score (ranking) and webpage classification design with or without information. Subsequent regression analysis will be conducted.

4.1.2. Some important functional plate design analysis

(1) Whether the web page has car information comparison function analysis

The author counted whether there were car information comparison functions or page data in the web page, and found that there were 26 websites with car information comparison functions or pages, and 24 websites without, and the data variables were unified and brought into SPSS 26.0 for data analysis. * means significant difference at the 10% level, ** means significant difference at the 5% level, and *** means significant difference at the 1% level.

Table 6. The independent sample T-test analysis result of whether the web page has the function of car information comparison.

	Whether the page has a car information comparison function/page (Mean value±Standard deviation)		<i>t</i>	<i>p</i>
	no(<i>n</i> =24)	yes(<i>n</i> =26)		
Site score	3457.38±216.42	3750.27±404.13	-3.228	0.003***

As shown in Table 6, we can see whether there is a car information comparison function in the web page or a page presents a significant difference in website scores ($p < 0.1$), there is a significant difference between the website score with or without the car information comparison function/page at the level of 0.01 ($t = -3.228$, $p = 0.003$). According to the results, the average score (ranking) of the website with the car information comparison function is significantly higher than that of the website without the car information comparison function. Correlation analysis will be carried out in the next step.

Table 7. Whether the page has a car information comparison function or the correlation analysis results of the page.

Whether the page has a car information comparison function or page	Site score	
	Correlation coefficient	0.415***
	<i>P</i> -value	0.003
	Sample size	50

There is a significant correlation between the car information comparison function/page in the webpage and the website score, * indicates a significant correlation at the 10% level, ** indicates a significant correlation at the 5% level, and *** indicates a significant correlation at the 1% level. The correlation value between website score and comparison function/page with or without car information is 0.415, showing a significant correlation ($p = 0.003$), indicating that there is a significant positive correlation between website score and comparison function/page with or without car information, as shown in Table 7. Subsequent regression analysis will be carried out.

(2) Automobile evaluation plate design analysis

The author counted whether the website had car evaluation section data. There were 29 websites with car evaluation section and 21 without. After the data variables were unified, the data was brought into SPSS 26.0 for data analysis. * means significant difference at the 10% level, ** means significant difference at the 5% level, and *** means significant difference at the 1% level.

Table 8. Does the website have the independent sample T-test analysis results of the automobile evaluation section.

	Whether the page has a car review section (Mean value±Standard deviation)		<i>t</i>	<i>p</i>
	no(<i>n</i> =21)	yes(<i>n</i> =29)		
Site score	3492.19±268.17	3694.76±391.56	-2.046	0.046**

As can be seen from Table 8, there is a significant difference in website scores between whether there is a car evaluation section in a website ($p < 0.1$), whether there is a car evaluation section has a significant difference on the website score at the level of 0.05 ($t = 2.046$, $p = 0.046$). Compared with the difference, it can be seen that the average score of the website with a car evaluation section is significantly higher than that of the website without a car evaluation section.

Table 9. Whether the website has the correlation analysis results of the design car evaluation section.

Whether there is a design car evaluation section in the web page	Site score	
	Correlation coefficient	0.283**
	P-value	0.046
	Sample size	50

There is a significant correlation between the design car evaluation section and the website score, * indicates a significant correlation at the 10% level, ** indicates a significant correlation at the 5% level, and *** indicates a significant correlation at the 1% level. The correlation value between website score and the presence or absence of design car evaluation plate was 0.283, and showed a significance level of 0.05 ($p=0.046$), indicating that there was a significant positive correlation between website score and the presence or absence of design car evaluation plate, as shown in Table 9. Subsequent regression analysis will be conducted.

Then, the author calculates the design position of the automobile evaluation section in the webpage, which can be mainly divided into four areas. There are 14 websites designed in the upper left corner of the webpage, 5 in the middle of the webpage, 7 in the upper right of the webpage, 4 in the middle of the webpage, and 20 websites without automobile evaluation section. After the data variables are unified, they are brought into SPSS 26.0 for data analysis. * means significant difference at the 10% level, ** means significant difference at the 5% level, and *** means significant difference at the 1% level.

Table 10. One-way ANOVA for the design of the car review board in different locations of the web page.

	The location of the car evaluation section (Mean value±Standard deviation)					F	p
	This plate is not designed (n=20)	Left above (n=14)	Middle of page (n=5)	Right above (n=7)	middle-lower (n=4)		
Site score	3494.10±274.99	3871.79±450.38	3800.20±198.58	3337.86±63.83	3507.75±44.34	5.198	0.002***

As can be seen from Table 10, the design of automobile evaluation section presents significant differences in webpage scores at different locations ($p<0.1$), the design of automobile evaluation section has a significant difference in the website score at the level of 0.01 ($F=5.198$, $p=0.002$). By comparing the difference, we can see that the average score of the design on the left side of the webpage is significantly higher than that of the design in other positions. The correlation analysis with the website score will be carried out in the future.

Table 11. The correlation analysis results of automobile evaluation section design in different locations of web pages.

The car review section is designed in different places on the page	Site score	
	Correlation coefficient	-0.076
	P-value	0.600
	Sample size	50

As can be seen from Table 11, the correlation between the design of the automobile evaluation board and the score of the webpage is weak in different positions of the webpage ($p>0.1$), * indicates a significant correlation at the 10% level, ** indicates a

significant correlation at the 5% level, and *** indicates a significant correlation at the 1% level. The correlation between web page score and the design of automobile evaluation board in different positions is -0.076, and the P value is $0.600 > 0.1$, indicating that there is no significant correlation between the website score and the design of the automobile evaluation plate in different locations, and no regression analysis will be conducted in the future.

(3) News and information section layout design analysis

In the questionnaire survey, although the proportion of respondents choosing the news information section is not high, since the news information contains a variety of important information about automobiles, such as new car listing, vehicle price adjustment, and application of new automobile technology, this section is set after comprehensive consideration. The author collated the data of 50 automobile websites and found that there were 14 news information plates on the top of the web page, 5 in the middle, 9 on the left, 6 on the right, 5 on the middle, and 11 websites without news plates. After the data variables were unified, they were brought into SPSS 26.0 for data analysis. * means significant difference at the 10% level, ** means significant difference at the 5% level, and *** means significant difference at the 1% level.

Table 12. One-way ANOVA results of news section design in different locations of web pages.

	The news section is designed in different places on the web page (Mean value±Standard deviation)						F	p
	None (n=11)	Center above (n=14)	middle (n=5)	Left above (n=9)	Right drift up (n=6)	middle-lower (n=5)		
Site score	3443.64±267.77	3878.64±409.71	3550.00±467.13	3607.33±274.16	3434.17±136.64	3496.40±212.96	2.997	0.021**

From the results in Table 12, we can see that the design of news and information section has significant differences in the score of web pages at different locations ($p < 0.1$), the design of news information section has a significant difference in the score of web pages at the level of 0.05 ($F=2.997$, $p=0.021$). Compared with the difference, it can be seen that the average score of the design of news information section in the upper part of the web page is significantly higher than that of the design in other positions. The correlation analysis with the score of web pages will be conducted in the future.

Table 13. The results of correlation analysis of news information section design in different locations.

The news section is designed in different locations	Site score	
	Correlation coefficient	-0.135
	P-value	0.349
	Sample size	50

From Table 13, we can see that the design of news and information section has a weak correlation with the score (ranking) of web pages at different positions ($p > 0.1$), * indicates a significant correlation at the 10% level, ** indicates a significant correlation at the 5% level, and *** indicates a significant correlation at the 1% level. The correlation between web page score and news information section design in different positions is -0.135, and the P value is $0.349 > 0.1$, indicating that there is no

significant correlation between website score and news information section design in different locations, and no regression analysis will be conducted in the future.

(4) The problem feedback function is designed and analyzed in different positions

According to the data of the statistical question feedback function designed in different positions of the webpage, 10 companies were designed in the right column and the bottom of the webpage, 26 companies were designed at the bottom of the webpage, 5 companies were designed in the right column, 3 companies were designed in the top navigation bar, and 4 companies did not have this function. After the data variables were unified, they were brought into SPSS 26.0 for data analysis. * means significant difference at the 10% level, ** means significant difference at the 5% level, and *** means significant difference at the 1% level.

Table 14. The question feedback function is designed in different locations of the web page with the results of one-way ANOVA.

	The problem feedback function is designed in different places on the page (Mean value±Standard deviation)					F	p
	none(n=4)	Right sidebar and bottom of page (n=10)	Bottom of page (n=26)	Right sidebar (n=7)	Navigation bar (n=3)		
Site score	3431.25±177 .63	3777.80±530 .42	3635.31±300 .32	3503.60±340 .67	3272.00±92 .97	1.35 1	0.26 1

From the results in Table 14, we can see that the design of question feedback function has no significant difference in the score of web pages at different locations ($p>0.1$), the design of the problem feedback function does not show significant difference in the score of the web page in different locations ($F=1.351$, $p=0.261$), and the subsequent correlation analysis with the score of the web page will not be carried out.

(5) Advertising factor analysis

By counting the number of web advertisements, the author decided to divide the websites with three advertisements and more into one category, and the websites with two advertisements and less into one category. It is found that there are 26 websites with more than three advertisements, and 24 websites with the following ones. After the data variables are unified, they are brought into SPSS 26.0 for data analysis. * indicates significant difference at the 10% level, ** indicates significant difference at the 5% level, and *** indicates significant difference at the 1% level.

Table 15. Analysis results of independent sample T test under different number of web ads.

	Whether there are three or more advertisements in the web page (Mean value±Standard deviation)		t	p
	no(n=21)	yes(n=29)		
Site score	3675.00±349.83	3549.38±358.85	1.252	0.217

From Table 15, we can see that there is no significant difference between the number of web ads and the score (ranking) of web pages ($p>0.1$), the difference in the number of web ads did not show a significant difference in the website score ($t=1.252$, $p=0.217$), and the subsequent correlation analysis with the website score was not carried out.

4.2. Navigation area design analysis

4.2.1 Top navigation bar design analysis

(1) Whether the page has a top navigation bar design analysis

The author sorted out the data of 50 automobile web pages in the previous period, and found 45 websites with top navigation bar function and 5 websites without top navigation bar. The data variables were unified and brought into SPSS 26.0 for data analysis. * represents significant difference at 10% level, ** represents significant difference at 5% level, and *** represents significant difference at 1% level.

Table 16. *The independent sample T-test analysis results of whether the web page has a top navigation bar design under the web page score.*

	Whether the page has a top navigation bar(Mean value±Standard deviation)		<i>t</i>	<i>p</i>
	no(<i>n</i> =5)	yes(<i>n</i> =45)		
Site score	3268.00±39.65	3647.64±355.99	-6.785	<0.001***

From Table 16, we can see that the design of web pages with top navigation bar presents significant differences in web scores ($p < 0.1$), whether there is a top navigation bar design in a web page has a significant difference in website score at 0.01 level ($t = -6.785$, $p < 0.001$), according to the comparison difference, the average score of web pages with a top navigation bar design is significantly higher than that of websites without a top navigation bar design, and the next step will be correlation analysis on web page scores.

Table 17. *Results of correlation analysis between top navigation bar design and web score*

Web page has no top navigation bar design		Site score
	Correlation coefficient	0.323**
	<i>P</i> -value	0.022
	Sample size	50

As can be seen from Table 17, there is a significant correlation between the top navigation bar design and the webpage score ($p < 0.1$), * indicates a significant correlation at the 10% level, ** indicates a significant correlation at the 5% level, and *** indicates a significant correlation at the 1% level. The correlation value between web page score and whether a web page has a top navigation bar design is 0.323, and there is a significant correlation at 0.05 level ($p = 0.022$), indicating that there is a positive correlation between web page score and whether a web page has a top navigation bar design. Subsequent regression analysis will be conducted.

(2) Page top navigation bar there is no secondary menu design analysis

After sorting and statistics of 50 automobile web pages, it was found that 33 of them had a secondary menu in the top navigation bar, while 17 did not. After data variables were unified, they were brought into SPSS 26.0 for data analysis. * represents significant difference at the 10% level, ** represents significant difference at the 5% level, and *** represents significant difference at the 1% level.

Table 18. *The independent sample T-test analysis results of whether there is a secondary menu in the top navigation bar of the webpage under the webpage score.*

	Whether there is a secondary menu in the top navigation bar of the page(Mean value±Standard deviation)		<i>t</i>	<i>p</i>
	no(<i>n</i> =17)	yes(<i>n</i> =33)		
Site score	3465.59±252.05	3683.91±382.41	-2.123	0.039**

According to Table 18, it is known that the design of the top navigation bar of a webpage has a significant difference in webpage score ($p < 0.1$), whether there is a secondary menu design in the top navigation bar of a webpage has a significant difference in website scores at the level of 0.05 ($t = -2.123$, $p = 0.039$).

By comparing the differences, we can see that the average score of a webpage with a secondary menu design in the top navigation bar is significantly higher than that of a website without a secondary menu in the top navigation bar. The next step is to conduct correlation analysis on web page scores.

Table 19. The correlation analysis results between the top navigation bar of web page and the score of web page.

Whether there is a secondary menu in the top navigation bar of the page		Site score
	Correlation coefficient	0.293**
	<i>P</i> -value	0.039
	Sample size	50

As can be seen from Table 19, there is a significant correlation between the design of the navigation bar at the top of the webpage and the score of the webpage ($p < 0.1$), * indicates a significant correlation at the 10% level, ** indicates a significant correlation at the 5% level, and *** indicates a significant correlation at the 1% level. The correlation value between web page score and the presence or absence of secondary menu design in the top navigation bar of web page is 0.293, and the significance level is 0.05 ($p = 0.039$), indicating that there is a positive correlation between web page score and the presence or absence of secondary menu design in the top navigation bar of web page. Subsequent regression analysis will be conducted.

(3) Analysis of interaction effect of mouse across navigation area

The author sorted out the statistical data of 50 automobile web pages, and found that 39 of them had interactive effects when the mouse crossed the top navigation bar, and 11 did not. After the data variables were unified, they were brought into SPSS 26.0 for data analysis, where * represents significant difference at 10% level, ** represents significant difference at 5% level, and *** represents significant difference at 1% level.

Table 20. Mouse across the top navigation bar has no interactive effect in the web page score under the independent sample *T*-test analysis results.

	Whether there is a secondary menu in the top navigation bar of the page(Mean value±Standard deviation)		<i>t</i>	<i>p</i>
	no(<i>n</i> =17)	yes(<i>n</i> =33)		
Site score	3465.59±252.05	3683.91±382.41	-2.123	0.039**

From Table 20, we can see that whether the mouse moves over the top navigation bar has an interactive effect has a significant difference in webpage scores ($p < 0.1$), the interaction effect of the mouse across the top navigation bar has a significant difference in the website score at the level of 0.01 ($t = -3.738$, $p = 0.001$).

By comparing the difference, we can see that the average score of the website with the interactive effect of the mouse across the top navigation bar is much higher than

that of the website without interactive effect. The next step is to conduct correlation analysis on the webpage score.

Table 21. By mouse across the top navigation bar, there is no interaction effect and the correlation analysis results of the page score.

		Site score
There is no interactive effect by mouse across the top navigation bar	Correlation coefficient	0.341**
	P-value	0.015
	Sample size	50

As can be seen from Table 21, there is a significant correlation between the interaction effect of mouse across the top navigation bar and web page score ($p < 0.1$). * indicates a significant correlation at the 10% level, ** indicates a significant correlation at the 5% level, and *** indicates a significant correlation at the 1% level. The correlation value between web page score and the interaction effect of mouse across the top navigation bar is 0.341, and there is a significant correlation at the level of 0.05 ($p = 0.015$), indicating that there is a positive correlation between web page score and the interaction effect of mouse across the top navigation bar. Subsequent regression analysis will be conducted.

(4) Design and analysis of web vehicle information screening area

After sorting out the data of 50 automobile websites, the author found that 36 websites had automobile information screening area and 14 did not. After the data variables were unified, they were brought into the SPSS software for data analysis. * represents significant difference at 10% level, ** represents significant difference at 5% level, and *** represents significant difference at 1% level.

Table 22. The independent sample T-test analysis results of whether there is a car information screening area in the web page score.

	Whether the page has a car information screening area (Mean value $\pm$ Standard deviation)		<i>t</i>	<i>p</i>
	no ($n=14$)	yes ($n=36$)		
Site score	3399.00 $\pm$ 139.91	3691.61 $\pm$ 382.23	-3.961	<0.001***

From Table 22, we can see that there is a significant difference in the score of web pages with or without auto information screening area ($p < 0.1$), the presence or non-presence of car information screening area had a significant difference in website score at 0.01 level ($t = -3.961$, $p < 0.001$), according to the comparison difference, the average score of the website with the car information screening area is much higher than that of the website without the car information screening area, and the next step will be correlation analysis on the page score.

Table 23. Correlation analysis results of whether there is car information screening area in webpage and webpage score.

		Site score
There is no car information screening area in the page	Correlation coefficient	0.372***
	P-value	0.008
	Sample size	50

As can be seen from Table 23, there is a significant correlation between the presence or non-presence of automotive information screening area on a webpage and the webpage score ($p < 0.1$). * indicates a significant correlation at the 10% level, ** indicates a significant correlation at the 5% level, and *** indicates a significant correlation at the 1% level. The correlation value between web page score and the

presence or absence of auto information screening area is 0.372, showing a significant correlation at the level of 0.01 ($p=0.008$), indicating a positive correlation between web page score and the presence or absence of auto information screening area. Subsequent regression analysis will be conducted.

4.2.2. Side navigation bar design analysis

(1) Web page whether there is a side navigation bar design analysis

After sorting out the data of 50 automobile web pages, the author found that 32 web pages had a side navigation bar design, and 18 did not. After the data variables were unified, they were brought into SPSS 26.0 for data analysis. * represents significant difference at 10% level, ** represents significant difference at 5% level, and *** represents significant difference at 1% level.

Table 24. The independent sample T-test analysis result of whether there is no side navigation bar in the web page score.

	Whether the page has no side navigation bar(Mean value±Standard deviation)		<i>t</i>	<i>p</i>
	no(<i>n</i> =18)	yes(<i>n</i> =32)		
Site score	3479.00±305.4	3684.19±366.55	-2.002	0.051*

By comparing the differences, we can see that the average score of websites with side navigation bar design is much higher than that of websites without side navigation bar. The next step is to conduct correlation analysis on webpage scores.

Table 25. The correlation analysis results of whether there is a side navigation bar in the web page and the web score.

Whether the page has a side navigation bar	Site score	
	Correlation coefficient	0.278*
	P-value	0.051
	Sample size	50

As can be seen from Table 25, there is a significant correlation between the design of side navigation bar and the score of web pages ($p<0.1$). * indicates a significant correlation at the 10% level, ** indicates a significant correlation at the 5% level, and *** indicates a significant correlation at the 1% level. The correlation value between web page score and web page with or without side navigation bar design is 0.278, and there is a significant correlation at the level of 0.1 ($p=0.051$), indicating that there is a positive correlation between web page score and web page with or without side navigation bar design. Subsequent regression analysis will be conducted with web page score.

(2) Whether the side navigation bar has a secondary menu design analysis

The author sorted out the statistics of 50 automobile web pages and found that 18 of them had a secondary menu in the side navigation bar of the web page, while 32 did not. After the data variables were unified, they were brought into SPSS 26.0 software for data analysis, * representing significant differences at 10% level, ** representing significant differences at 5% level, and *** representing significant differences at 1% level.

Table 26. *The independent sample T-test analysis results of whether there is a secondary menu in the side navigation bar of the webpage under the webpage score.*

	Whether the side navigation bar has a secondary menu(Mean value±Standard deviation)		<i>t</i>	<i>p</i>
	no(<i>n</i> =32)	yes(<i>n</i> =18)		
Site score	3500.41±273.93	3803.94±408.98	-3.139	0.003***

From Table 26, we can see that there is a significant difference between the side navigation bar and the secondary menu in the webpage score ($p < 0.1$), whether there is a secondary menu in the side navigation bar of a webpage has a significant difference in website scores at the level of 0.01 ($t = -3.139$, $p = 0.003$). By comparing the differences, we can see that the average score of websites with secondary menus in the side navigation bar is much higher than that of websites without secondary menus in the side navigation bar. The next step is to conduct correlation analysis on web page scores.

Table 27. *The correlation analysis results of the side navigation bar with or without secondary menu and web page score.*

	Site score	
	Correlation coefficient	0.413***
	P-value	0.003
	Sample size	50

As can be seen from Table 27, there is a significant correlation between the presence or lack of a secondary menu in the side navigation bar of a webpage and the webpage score ($p < 0.1$). * indicates a significant correlation at the 10% level, ** indicates a significant correlation at the 5% level, and *** indicates a significant correlation at the 1% level. The correlation value between web page score and the presence or absence of secondary menus in the side navigation bar of a web page is 0.413, showing a significant correlation at the level of 0.01 ($p = 0.003$), indicating that there is a positive correlation between web page score and the presence or absence of secondary menus in the side navigation bar of a web page. Subsequent regression analysis will be conducted.

(3) Mouse across the side navigation bar has no interaction effect analysis

After sorting and statistical data of 50 automobile web pages, it was found that 29 websites had interactive effects when mouse crossed the side navigation bar, and 21 websites had no interactive effects. After data variables were unified, they were brought into SPSS 26.0 for data analysis. * represents significant difference at 10% level, ** represents significant difference at 5% level, and *** represents significant difference at 1% level.

Table 28. *Mouse over the side navigation bar has no interactive effect in the web page score under the independent sample T-test analysis results.*

	Whether the side navigation bar has a secondary menu(Mean value±Standard deviation)		<i>t</i>	<i>p</i>
	no(<i>n</i> =21)	yes(<i>n</i> =29)		
Site score	3499.29±298.64	3689.62±378.25	-1.913	0.062*

From Table 28, we can see that whether the mouse moves over the side navigation bar has an interactive effect has a significant difference in webpage score ($p < 0.1$), the interaction effect of the mouse over the side navigation bar has a significant difference

on the website score at the 0.1 level ($t=-1.913$, $p=0.062$), and the correlation with the website score will be analyzed in the future.

Table 29. The mouse over the side navigation bar has correlation analysis results of whether there is interaction and page score.

Mouse over the side navigation bar has whether there is a mutual effect	Site score	
	Correlation coefficient	0.266*
	P-value	0.062
	Sample size	50

As can be seen from Table 4.26, there is a significant correlation between the interaction effect of the mouse across the side navigation bar and the score of the webpage ($p<0.1$). * indicates a significant correlation at the 10% level, ** indicates a significant correlation at the 5% level, and *** indicates a significant correlation at the 1% level. The correlation value between web page score and the interaction effect of mouse across the side navigation bar is 0.266, and the significance level is 0.1 ($p=0.062$), indicating that there is a positive correlation between web page score and the interaction effect of mouse across the side navigation bar, and regression analysis will be conducted in the future.

4.3. Analysis of design elements of web search functional area

4.3.1. Influence analysis of web search bar distribution area

The author statistics the position of the search bar in the design of the web page, which can be divided into five areas. There are 2 companies designed in the middle of the page, 7 in the upper left, 22 in the upper right, 2 in the middle right, 9 in the upper right, and 8 without search bar. After data variables are unified, they are brought into SPSS 26.0 for data analysis. * means significant difference at the 10% level, ** means significant difference at the 5% level, and *** means significant difference at the 1% level.

Table 30. One-way ANOVA results of search bar design in different locations of web pages under web page scores.

	Search bars are designed at different locations on the page (Mean value±Standard deviation)						F	p
	none(n=8)	Middle of page (n=2)	Upper left (n=7)	Upper right (n=22)	center-right (n=2)	Right above (n=9)		
Site score	3479.13±208.70	3401.00±106.07	3686.71±489.66	3596.18±278.62	3300.50±31.82	3813.89±501.19	1.363	0.257

From the results in Table 30, we can see that the search bar design has no significant difference in the score of web pages at different locations ($p>0.1$), the search bar design did not show a significant difference in the score of the web page in different locations ($F=1.363$, $p=0.257$), and the subsequent correlation analysis with the score of the web page will not be carried out.

4.3.2. Web search bar response border design analysis

After sorting out the data of 50 automobile websites, we found that there were 35 websites with response borders in the search bar and 15 websites without. After the data variables were unified, they were brought into SPSS 26.0 for data analysis. *

means significant difference at the 10% level, ** means significant difference at the 5% level, and *** means significant difference at the 1% level.

Table 31. *Whether the search bar has a response border design under the page score independent sample T analysis results.*

	The search bar has no response border (Mean value±Standard deviation)		<i>t</i>	<i>p</i>
	no(<i>n</i> =15)	yes(<i>n</i> =35)		
Site score	3473.53±216.14	3668.03±390.31	-1.808	0.077*

As can be seen from Table 31, the search bar with or without response border design has a significant difference in webpage score ($p < 0.1$), whether the search bar has a response border design has a significant difference in the website score at the 0.1 level ($t = -1.808$, $p = 0.077$), and the subsequent correlation analysis with the website score will be carried out.

Table 32. *Correlation analysis results of whether the search bar has responsive border design and web page score.*

Whether the search bar has a responsive border design	Site score	
	Correlation coefficient	0.252*
	P-value	0.077
	Sample size	50

From Table 32, we can see that there is a significant correlation between the response border design of the search bar and the score of the webpage ($p < 0.1$). * indicates a significant correlation at the 10% level, ** indicates a significant correlation at the 5% level, and *** indicates a significant correlation at the 1% level. The correlation value between web page score and search bar with or without responsive border design is 0.252, and there is a significant correlation at the 0.1 level ($p = 0.077$), indicating that there is a positive correlation between website score and search bar with or without responsive border design. Subsequent regression analysis will be conducted.

4.4 Regression model establishment and analysis

In the single factor analysis, variables with statistically significant differences at the 0.1 significance level were included in the multi-factor analysis to establish a multiple linear regression model. Multiple linear regression analysis was carried out with 11 variables as independent variables and website score as dependent variable. The multiple linear regression model assignment is shown in Table 33.

Table 33. *Analysis results of influencing factors of website score.*

Design factors that have significant differences/correlations with web page scores	coefficient
Whether there is information classification design	0.001***
Whether there is a car information comparison function or page	0.003***
Is there a car evaluation section	0.046**
Whether there is a top navigation bar design	0.022**
Whether there is a top navigation bar secondary menu	0.039**
Whether the mouse over the top navigation bar has an interactive effect	0.015**
Whether there is a car information screening area	0.008***
Whether there is a side navigation bar design	0.051*
Whether the side navigation bar has a secondary menu	0.003***

Whether the mouse over the side navigation bar has an interactive effect	0.062*
Whether the search bar has a responsive border design	0.077*

After the regression model was established, multiple regression analysis was carried out, as shown in Table 34.

Table 34. Results of multiple linear regression model analysis on factors influencing website scores.

	Nonnormalized coefficient		Standardization coefficient	<i>t</i>	<i>p</i>	Collinearity diagnosis	
	<i>B</i>	Standard error	Beta			VIF	tolerance
constant	3299.88	77.553		42.55	0.000**		
Whether there is a top navigation bar	224.177	99.12	0.291	2.226	0.030*	1.146	0.869
Whether there is information classification design	213.185	95.998	0.286	2.221	0.031*	1.175	0.851
Whether the side navigation bar has a secondary menu	203.580	91.867	0.277	2.216	0.032*	1.104	0.905
Whether there is a information comparison function/page	184.234	89.730	0.261	2.053	0.046*	1.141	0.876
<i>F</i>	<i>F</i> (3,46)=8.260, <i>p</i> =0.000						

From Table 34, we can see that after multiple regression analysis, the final remaining pages have four design factors: whether there is a top navigation bar, whether there is an information classification design, whether there is a secondary menu in the side navigation bar, and whether there is a car information comparison function/page.

The model passed the F test ($F=8.260$, $p=0.000<0.05$), indicating that the model is valid. The regression coefficient of whether the web page has a design top navigation bar is 224.177($t=2.226$, $p=0.03<0.05$), which means that whether a page has a top navigation bar design will have a significant positive impact on the score of the page; The regression coefficient of whether web pages have information classification design is 213.185 ($t=2.221$, $p=0.031<0.05$), indicating that whether a web page has information classification design will have a significant positive impact on web page scores; The regression coefficient of whether there is a secondary menu in the side navigation bar is 203.58($t=2.216$, $p=0.032<0.05$), indicating that whether there is a secondary menu in the side navigation bar of a web page will have a positive impact on the score of the web page; The regression coefficient of whether the web page has the design car information comparison function/page is 184.234($t=2.053$, $p=0.046<0.05$), which means that whether a web page has a design car information comparison function/page will have a significant positive impact on the web score. According to the Beta value, the importance of several design factors is: whether the page has a top navigation bar >Whether the web page has information classification design>Is there a secondary menu in the side navigation bar?>Whether there is a car information comparison function/page.

5. Conclusions

Based on user experience, this paper makes a lot of research and analysis on web page interaction design. Firstly, through user interviews, it is roughly understood that the purpose of users using car web pages is to understand the selling price, configuration, appearance and other information of cars. Secondly, in order to further narrow the scope of users' needs, the author designs a questionnaire. We found that users are most concerned about the functional Settings and visual feelings of the web filter car, followed by the details of subsequent services and interactive operations. Considering that the questionnaire is limited by user subjectivity and sample size, in order to obtain a more scientific quantitative result, the author collected the functional data of the top 50 automobile websites of Webmaster's Home according to the results of the questionnaire, and took the statistical data as independent variables and the score of webpage ranking as dependent variables for data analysis. The results of multiple linear regression show that, Whether the page has a top navigation bar design, whether the page has an information classification design, whether the page has a secondary menu in the side navigation bar, and whether there is a car information comparison function, these four design factors have a significant correlation with the score of the page, which indicates that these four design factors have an important impact on the user's experience.

For automobile web page interaction design, we should first find a way to accurately find user needs, followed by the design of the UI interaction interface, so as to correct the problem.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

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