

Research paper

Identifying Components Of Information Visualization Related To User Xperience In the Digital Library

Golnoush Diyanat*, Mohammad Zerehsaz**

Date Received: 2020-10-31

Date Revised: 2020-11-15

Date Accepted: 2020-11-18

Abstract:

Purpose: The purpose of this study is to identify the components of information visualization related to user experience in the digital library of Allameh Tabatabai University. **Method:** The research method is thinking aloud protocol and with a qualitative approach. The study population was undergraduate, graduate and PhD students(30 people) who were purposefully selected as a sample population . Data collection was performed using Morae software, face-to-face observation, researcher's notebook and users' audio files. **Findings:** show that elements such as fonts, color combinations, graphic images and their placement and arrangement in library website pages have been of interest to users. Problems include not knowing how to search at an advanced level, as well as the use of some image icons. Based on the given evidence, elements such as fonts, color combinations, graphic images, and their placement on page have been important to users. Users considered the suggestion of using animated visual symbols necessary in order to make the appearance attractive and facilitate users' information-seeking behavior, which to a large extent overlaps with the principles and basis of information visualization. In this way, the use of eye-catching tools such as blinking characters, in turn, can play a key role in identifying important parts. **Conclusion:** Using fewer visual elements on the front page to increase the focus on the front page, using navigation features on the search page, and displaying a sequence of retrieved records on the page of findings were some of the common points that users mentioned

Keywords: Information visualization, Digital library, User experience, Allameh Tabataba'i University

* Corresponding Author, MA in knowledge and information science Department , Allameh Tabataba'i University ,Tehran, Iran, Email : goldi9407@gmail.com

** Assistant professor , Knowledge and Information Science Department , Kharazmi University, Tehran, Iran ,Email:mzerehsaz@gmail.com

Introduction

Visualization is an informational area of computer science based on technology and network analysis software. Knowledge and specialized knowledge in the field of computer graphics, infographics, statistical graphs, retrieval in information systems, drawing science maps and knowledge maps in scientometrics are essential in visualizing information (Doroudi and Alipour, 2013). Visualization of information and analysis in scientific studies is explained to the specialists of information science, especially researchers and activists of the field of science, and they badly need to know about the principles of visualizing information and also to gain practical experience in the field (Doroudi, 2015 ; Doroudi and Mohamadali pour, 2013).

Information visualization is a subject that has recently been considered by digital library designers due to successive changes in users' information needs. Visual elements, infographics, shapes that convey maximum content to the audience with minimal details have become more popular among users, as today's user expects to access the largest amount of information within the least amount of time. Designing a digital library with an emphasis on user experience helps users to understand information more easily (Doroudi,2009).

In user experience, feeling, thought, requirements, and user conditions are checked in interaction with a product, service, or information system. In fact, user experience offers digital library propositions of value such as (satisfaction-oriented and demand-oriented features) that include users' behaviors and attitudes and their real motivations in using the library. By analyzing these value propositions, we can infer and investigate the deeper and latent needs of users and the results can be used in digital library design (Rajabali Beglouand and fatahi, 2016; Norouzi and Soltanali Dastjerdi, 2015).

Referring to previous research show that exploiting or linking metadata from different sources and making them accessible for recovery by using only minimum technical standards related to data properties and recovery to meet the information needs of the user is not enough. Users of digital libraries have the right to develop a kind of integration in a variety of information (including security, library resources, research and other basic information, time string data, project information, researchers' files, etc.).

Considering that the digital library of Allameh Tabataba'i University is a valid database, It is for students and professors, apart from being rich in terms of providing resources in a variety of formats, to display visual elements for users of good desirability and function so that he can have the best experience in using website services within the least amount of time. Considering that the way information is presented in the digital library pages of Allameh Tabataba'i University such as (how to display, inappropriate layout of shapes, how to display ingested in the findings section, problems caused by lack of information in using different parts of the website, communication problems between resources found with the desired resources) has not been done well and the speed of data recovery for users is low. Therefore, part of the user's time and focus in the digital library is attracted to unnecessary details and this makes it possible to spend more time retrieving the parts of their desired content. A collection of pages of the Digital Library website of Allameh Tabataba'i University has more use and audience in the process of information retrieval and forms the core of users' information retrieval behavior in the digital library of Allameh Tabataba'i University, therefore, this research is based on three pages. The main and fundamental website (home page, findings and results page) will answer the following questions:

1. Which visual elements in the first pages, search and findings of the digital library of Allameh Tabataba'i University have been considered by the user?
2. What are the problems of users in identifying the codes of visual elements on the first pages, searching and findings of the digital library of Allameh Tabataba'i University?
3. What are the suggestions of users to improve the visual status of the digital library pages of Allameh Tabataba'i University?

Method

The present study is an applied research and has been conducted with a thinking aloud protocol method without the intervention of the researcher. Users searched and retrieved their data performing the tasks requested by the researcher and completed the process. The difference between this method and other methods is that there are no restrictions for the user in terms of verbal expression about defined tasks.

The study population consisted of 30 undergraduate, postgraduate and PhD students of Allameh Tabataba'i University who were selected by targeted sampling .

In this research, data have been collected using thinking aloud protocols and direct observation. The data collection tool consisted of Morae software and digital library of Allameh Tabataba'i University for the effect of information visualization on user informational behavior. Designing research scenarios and defined step for participants was done based on user experience according to the following table:

Table 1 Defined Tasks for Research Participants Based on The Overall Stages of User Experience

General steps of user experience	Tasks defined for participants
Explaining information needs	1. The theme "Sciencemetrics" has been selected as the keyword. 2. Using limiting agents, there are presentable results.
Database Selection	The database intended for this keyword is the digital library of Allameh Tabataba'i University.
Search	The user has been asked to perform this word as a simple and advanced search and store the results in the text file, after which he will search for other formats related to the title and use the agents in this section.
Evaluation of search findings	Among the findings, separate the items that are more relevant and store them in the text file.

The process of collecting information was such that in the laboratory of knowledge and information science of Allameh Tabataba'i University, users were invited individually and for each person on average, about 30 to 40 minutes was available. The data collection phase was done by setting up the audio recorder and running the software, and the users were requested to announce all their comments and feelings about the visual and graphical items on the first page of the website, clearly and loudly and without limitation, and then try to

perform the tasks as well. Comment process on all points related to elements: Design, color and graphical symbols have been important during tasks (Zerehsaz, 2014,2015). In cases where the examinee was satisfied with the use of this software to record the activities of the subject, his actions and reactions have been recorded for data analysis and other cases have been written completely in the form of loud thinking and inserting points and comments. Coding important items in the user experience of the Digital Library of Allameh Tabataba'i University is summarized in the following states:

Table 2. Coding user experience in digital library of Allameh Tabataba'i University

Code	Code Description
1	User's inability to work with simple search section
2	User's inability to read due to font type and size
3	User's weakness in getting to know the capabilities and features of the digital library
4	User's inability to access website information
5	Weakness in the design of used menus
6	The weakness of design in encouraging the organization to follow the visual information process
7	User inability to work with advanced search section
8	Inability to locate and use website guide
9	Design weakness in choosing and proper ordering of colors to draw attention to key points
10	Design weakness in how records are displayed
11	Design weaknesses in displaying content within each record
12	Inability to identify graphic elements

Findings

Question 1: Which visual elements on the first pages, search and findings of the digital library of Allameh Tabataba'i University have been considered by the user?

In the process of data collection, it has been tried to pay more attention to the points that have been considered by the audience. In the steps considered, the user is asked to express all their opinions and thoughts about colors, graphical symbols, fonts and content on the first pages, search and findings.

What have been the elements of users' attention on the home page?

In this section, the user is requested to express their opinion about the items visible on the page in a loud and large way and to say how much visual elements have been taken into consideration by the user. The elements on the first page are the determinants of what the user will do and if it is satisfactory to him, he will remain on the site and if it is not useful, he will stop continuing the process of retrieving information and will receive guidance from the librarian to get his resources.

Table 3- Elements of user interest in the home page

Sections	Visual Elements	Quote
1	Color - Language	"Some users believed that the background color was not very attractive and they were interested in changing their tastes, but very few of them were aware of the possibility on the left and top of the front page". "During questioning, they were more inclined to use warm but gentle and related colors for different graphical symbols upon entering the website in a warm but gentle and related range. They didn't know how to change the language either," he said.
2	Inappropriate location of graphical elements	"The audience was more likely to look for the search section in the center of the page, and they realized carefully that section 2 was related to this issue, and they were more inclined to replace section 3 with 2 because it offers more and more specific space for the audience to perform the information process, and in addition, due to the centrality of the core of the website page, the user can be more easily focused on the desired section. Be it," he said. "The important issue in this section was that there were many users between sections 2 and 4 in terms of images and insufficiency in textual explanation, they did not notice the difference between the sections and the last priority was to click for them because all of these sections were believed to display the same result as the record". It should be noted that few would have noticed that the advanced search section could be done from the same box.

3	Order in graphic design	"The important point in this section is that it makes the user wander because it is located at the center of the page and because the banner is moving, the audience's focus for reaching the desired section is reduced faster".
4	Graphical symbol and design	"It was found ambiguous by the audience that is they did not understand or care about the presence of this graphic symbol except for users who had studied this issue in their lessons".
5	Font and graphical symbol	The user does not understand the visual difference between this section and section 2, and in addition, the text is not illustrative.
6	Shape (image, painting, portrait)	Some contacts had no idea why sections 6 and 10 " were located that displayed a content, and another point is that the graphical symbols around section 7 were not much noticed because at the time of entering the first page, they were more likely to be simple and ".advanced to the world of search
7	Menu – Graphic symbols - Color	A number of users asked questions about the lack of " help during the search, and less attention was paid to the presence of graphical symbol 7 on the home screen, and it is likely that due to (the reasons are based on the audience's statements) the large number of different and large graphical symbols without any color difference among them has minimized the user's attention to key sections in order to facilitate ".searching and retrieval of information
8	Graphical icon	A number of users were not aware of the existence of this possibility at all and did not pay much attention to the presence of different graphical symbols on the same page, because some at the time of arrival expressed orally the existence of this number of graphic symbols that do not have a clear image and do not know what they are using and are confused as the reason
9	Menu – Graphical Icon	As can be seen in the image above, the content of the new graphical icon overlaps with the menu section of the new ones, and the audience did not pay attention to the graphical symbol at all and merely viewed the menu at the end of the screen.
10	Shape (pictured)	This section has little information and in addition, the photo with the content inside it is not attractive and comprehensive enough.

*Other items that have not been numbered have not been taken into consideration by the user(zerehsaz,2014,2015).

As can be seen in Table 3, it has been tried to refer to the issues that have been discussed in the studies of the texts in order to determine the visual elements, and the opinion of users in confronting the elements and their strengths and weaknesses is given as a quotation that in this section only the points related to the first page have been evaluated. According to the predictions made for this page, it is completely in line with the description of the task defined for users and most of the visually expected items that are expected to be mentioned , have been addressed.

What were the elements of users' attention on the search page?

In this section, we have tried to use the tasks defined for the user in the form of a specific word search, the process of retrieving his/her information in terms of visual elements has been investigated. The search section is an important element and an interface between the home page and the findings page, which plays a key role between the two pages because it is an interface between what the user needs and what the user wants to access.

Table 4 - Elements of interest to users on the search page

Sections	Visual Elements	Quote
1	Graphical icon	"Some users believed that it would have been better to use advanced search and use Boolean acts in part 1 because there was little attention paid to Section 3 and due to the ungovernable graphical appearance to attract the user's attention, it has not had much success. Some users who were familiar with these activities, , believed that the help section could be pop-up notification with the possibility of deactivation, in which case the use of advanced search possibility would be more desirable".
2	Graphical icon	Some users did not pay attention to the existence of section 2 due to a weakness in visual design of the guide elements, and the advanced search process, especially for those who were little familiar with the processors, was difficult to do.
3	Font – Color	"If it was possible that this section was visible by default without having to click, it would be better".

As It can be seen in Table 4, it has been tried to refer to the issues that have been discussed in the studies of the texts in order to identify the visual elements, and the user's opinion in dealing with the elements and their strengths and weaknesses are given as a quotation that in this section only the points related to the search page have been evaluated. Redesigning can become a more visually attractive part, and easier to increase accuracy in the information process.

What were the elements of users' attention on the findings page?

In this section, most of the audience's satisfaction with how visual elements are displayed on the findings page is considered to investigate how much the visual elements of the displayed data have been taken into consideration by the user.

Table 5- Elements of Interest in the Findings Page in the Digital Library of Allameh Tabataba'i University

Sections	Visual Elements	Quote
1	Font	A number of users had difficulty finding the number of records, and during the search process verbally stated that it was better to consider a part to display an inventory that remained hidden from the audience due to font size and illegalization.
2	Shape (picture)	The lack of a photo from the cover or the document in question minimizes the searcher's motivation to want all retrieved records, so that some of them stated that it was better to use specific visual images related to the documents in part 2 to encourage the continuation of the process in addition to increasing the speed of the audience in recovery.
3	Graphical icon	A number of contacts did not pay attention to the existence of this section in order to do a re-search, because it is flawed in terms of the necessity of the presence of help elements that should have been considered on the screen to guide the eye, and inevitably the person used the return button in the browser.
4	Location of graphical icon	The location of the text (home page) is not suitable and some users did not pay attention to the presence of this section and again searched the site of Allameh Tabataba'i Digital Library in the browser.

Sections	Visual Elements	Quote
5	How to work with graphical symbol	Some audience members had difficulty searching for advanced searches, the second phase of their job descriptions, and received guidance from the researcher.
6	Location of graphical icon	A number of contacts did not pay attention to the existence of this section in order to do a research, because it is flawed in terms of the necessity of the presence of help elements that should have been considered on the screen to guide the eye, and inevitably the person used the return button in the browser.

It has been tried to refer to the issues that have been discussed in the studies of the texts in order to determine the visual elements, and the user's opinion in confronting the elements and their strengths and weaknesses is to be quoted as a quotation that in this section only the points related to the findings page have been evaluated. It's taken users time to communicate with all that's inside. Because on arrival, the way elements are displayed is such that the most convenient way of accessing what he needs is not considered and is required to investigate the conformity or mismatch of the records with each other.

Question 2: What are the problems of users in identifying the codes of visual elements on the first pages, searching and findings of the digital library of Allameh Tabataba'i University?

Since the user interface has a great mental and objective effect on the user and his skills in recognizing the right use of information databases are necessary, paying attention to its properties during the design and reviewing the feedback of the audience is necessary . Some of these problems are either caused by weaknesses in graphic design or due to the user's inability to recognize visual elements.

Users' problems in identifying the codes of visual elements of the home page

In the research process, users shared some of the items on the first page that they encountered during defined tasks, which are followed by problems raised by users along with the frequency and percentage.

Table 6 - Codes of Visual Elements Home

User Problems	Code	Example Witness	Frequency	Frequency percentage
User's inability to work with simple search section	1	"A number of graphic symbols are dumb to me;" "Can I do both types of searches in one place"	76	29
User's inability to read due to font type and size	2	"I think larger font usage is better;" "It doesn't have much charm and it's boring;"	40	15
User's inability to work with advanced search section	7	"Is it possible to search advanced on the front page"?	5	1
User's weakness in getting to know the capabilities and features of the digital library	3	"I think it is only possible to use a digital library to retrieve categories and has no other features;" "I'd rather get help from the librarian while using the site;"	22	8
User's inability to access website information	4	"They are not located in the right place." "Help icons for browsing pages could be more telling in terms of design and size";	35	13
Weakness in the design of used menus	5	"I wish I could get an overview of what's on the menus" I think some of the menus on the front page cause confusion and are not working;" "Unable to personalize menu to facilitate user data recovery process"	33	12
The weakness of design in encouraging the organization to follow the visual information process	6	"Due to the lack of attractiveness in how content is displayed and the lack of visual graphs, there is no encouragement for the audience to remain more persistent on website pages;"	37	14

User Problems	Code	Example Witness	Frequency	Frequency percentage
		It was better to use the hierarchical display more;" "Pages are not attractive enough and user-friendly elements are not used;" "Elements of management do not have a good balance on the pages"		
Inability to identify graphic elements	12	"I never noticed the existence of the option (go to the next page) and (back to the previous page)"	6	2
Total			254	100

The findings of Table 6 show that users, regardless of reference to the elements of the previous questions, express the problems on the first page with their personal opinion and the researcher has been able to define the codes related to this issue in order to finally reach a general conclusion based on the frequency and percentage of the frequencies obtained.

Users' problems in detecting and identifying the codes of visual elements of the search page

In the research process, users shared some of the things on the search page that they encountered during defined tasks, which are followed by problems raised by users along with a large number and percentage.

Table 7 - Codes for Visual Elements of the Search Page

User Problems	Code	Sample	Frequency	Frequency percentage
User`s inability to work with advanced search section	7	"I don't know the difference between simple and advanced search;" "Guide me to work with Boolean agents;" "I wish there was a section on how to use the Advanced Search section;" "Why is the guide below the search section? I had never taken notice of it."	33	41
Inability to place and use website guide	8	"If the guide was in a certain place, less time would be spent on retrieving the content;" "It's very hard to find the help section;" "I don't understand the help section, please help me find out how to search for the essays".	28	35
Design weakness in choosing and proper ordering of colors to draw attention to key points	9	"How do I limit the search result to digital sources or thesauri' "? "The application section of the search filter is not appealing to me"	9	11
User's inability to read due to font type and size	2	"Fonts are illegible to me in terms of size;" "It would have been better if the fonts had a larger size".	10	12
Total			80	100

The findings of Table 7 show that users, regardless of reference to the elements of interest in previous questions, express the problems on the search page with their personal opinion, and the researcher has been able to define the codes related to this issue in order to reach a general

conclusion based on the frequency and percentage of the items occurred.

Users' problems in identifying the codes of visual elements of the findings page

In the research process, users jointly pointed to some of the items on the findings page that they encountered during defined tasks, which are followed by problems raised by users with a large number and percentage.

Table 8 - Codes of Visual Elements of the Findings Page

User Problems	Code	Sample	Frequency	Frequency percentage
Design weakness in how records are displayed	10	"I don't know if the recovered records are relevant to my need ". "It is not possible to categorize records by the desired format;" "I wish I could find all the works of a writer as diagramming or classified;" "The display section of the number of records is not in the right place"	39	32
Design weaknesses in displaying content within each record	11	"Image icons, along with records, do not provide any useful information and the photos are empty;" "I wish there was a possibility that if a suitable resource was needed, we could click on it to read more details, and in terms of appearance layout, there would be authority for the user".	68	57
Design weakness in choosing and proper ordering of colors to pay attention to key points	9	"The color used in displaying information is identical and is a distinction between displaying the information of the book and the author and ... Not complied with" 12 10	12	10
Total			119	10

The findings of Table 8 indicate that users, regardless of the references to the elements of the previous questions, express the problems in the findings page with their personal opinion and the researcher has been able to define the codes related to this issue in order to reach a general conclusion based on the frequency and percentage of the frequencies obtained.

Question 3: What are users' suggestions for improving visual elements?

Based on the criteria set out in the article "Basics and Strategies for Visual Presentation and Visual Display of Information", (Zerehsaz & Fattahi , 2006), the following criteria were considered for displaying information on pages (first, search and findings) in digital libraries:

- The ideal page should have a regular, manicured and uncrowded appearance and follow the appropriate visual design rules, which are: balance, symmetry, space saving and correct sequencing.
- Using up to 30% of information display area
- Use up to sixty characters per line
- Use empty spaces (without writing) between sections or paragraphs
- Text placed in the center of the screen
- Use fonts and padding marks
- Use attention-attracting tools such as flashing characters, luminosity, and reverse images
- Use multiple pages instead of using a page with scroll properties
- Insert all information about a subject and a task on one page
- Name each page on
- Label all elements on the page (Doroudi & Alipour , 2006)
- Other elements such as color, visual symbols, ease of identification of symbols, easy communication with message, differentiation of signs from each other and simplicity were also considered.

Users' suggestions according to their user experience for the home page of Allameh Tabataba'i University digital library are shown in Table 9:

Table 9 User Suggestions for Home Page

Section	User Suggestions	Quotations
1	<ol style="list-style-type: none"> 1. Modify font 2. Use animated image symbols 3. Options (buttons) 	<p>"Better will be the color and type of graphical symbols.It is better to use larger and more readable fonts plus graphical symbols with images closer to their content' "</p> <p>"It's also better to put the buttons in a clearer place".</p>
2	<ul style="list-style-type: none"> .\Change background color .\Remove number of icons .\Create functional menus 	<p>"Better will be the color and type of graphical symbols It is better to use larger and more readable fonts plus graphical symbols with images closer to their content".</p>
3	<ol style="list-style-type: none"> 1.Ease of determining the nature of the symbol <ul style="list-style-type: none"> .\Use attention-attracting tools such as flashing characters, luminosity, and reverse images 	<p>"It is better to place a simple and advanced search box in the center of the page instead of the moving banner box;"</p> <p>"It seems better to animate the way the box is displayed in order to specify the search section"</p>
۴	Ease of determining the nature of the symbol	"It's best to make a differentiation between icon 2 and 5, visually because it's hard to understand the content within it".
۵	<ol style="list-style-type: none"> 1.Ease of determining the nature of the symbol 2.Differentiate signs from each other 	"There was little understanding of the necessity of the video and gallery section on the front page, which was suggested to be placed at the top of the page in order to reduce the elements that lead to confusion on the front page".
6	<ol style="list-style-type: none"> 1. Ease of determining the nature of the symbol 2. Use attention-attracting tools such as flashing characters, luminosity, and reverse images 	"It seems better to use the menu with a convenient and user-friendly design instead of the presence of many visual symbols".

Users' suggestions according to their user experience for the search page of the Digital Library of Allameh Tabataba'i University are shown in Table 10 :

Table 10 User Suggestions for Search Page

Section	User Suggestions	Quotes
1	<ol style="list-style-type: none"> 1. Use visual space 2. Use attention-attracting tools such as flashing characters, luminosity, and reverse images 	<p>"It is better to include in this section the help section with signs that are easier to read and understand the concept;</p> <p>"It is better to use the content within Allameh Tabataba'i's digital library guide, as help tips on the sidelines of the page, with the possibility of rejecting the help section".</p>
2	<ol style="list-style-type: none"> 1. Use animated image symbols 2. Options (buttons) 	<p>"It is better to redesign the advanced search position to facilitate work with Boolean acts to minimize user confusion".</p>

Users' suggestions according to their user experience for the findings page of the Digital Library of Allameh Tabataba'i University are shown in Table 11:

Table 11 User Suggestions for Findings Page

Section	User Suggestions	Quotes
2	" Convenient communication with messages	The number of characters visible in the text elements of the search results section is high, and in addition to the user not wanting to browse, the key parts are also hidden from his view, which is better to be the menu accordion than any part he or she wants to display".
2	<ol style="list-style-type: none"> 1. Image Symbols 2. Use animated image symbols 3. Use attention-attracting tools such as flashing characters, luminosity, and reverse images 	<p>"The number of characters visible in the text elements of the search results section is high, and in addition to the user's reluctance to browse, the key parts are also hidden from his view, which is better to be an accordion menu than any part he or she wants to display; More easily search for what you need: " .</p> <p>"It is better to consider more of the help badges for faster and easier use to the possibilities".</p> <p>"It is better to use the original images of resources instead of the blank images on the</p>

Section	User Suggestions	Quotes
		<p>results page' ". "If, instead of displaying the rectum linearly, it is possible to tree resources based on the year of publication, author, etc. There was help to make resources accessible in one place and more regularly, and for the user to enjoy more visual attractiveness" .</p>

Visual elements should also have a suitable user in order to balance each other in a way that is attractive to the user.

Conclusion

Visualization of information is one of the new ways to convert information into image format in order to better understand information. Directly, without any practical instructions to receive their answers, visualization in the design of the interface can provide facilities and capabilities such as visibility of the state of the system, conformity between the system and the real world, monitoring and ease of use, compatibility. And using benchmark patterns, the ability to prevent errors, flexibility and effectiveness of use, artistic design and beauty observance, helping to better identify the user, identifying problems and the possibility of repairing errors, helping and providing documented explanations. (Azadi ahmadabadi, 2014). The present study was conducted to identify the components of information visualization in user experience in visual and graphical elements of digital library software system of Allameh Tabataba'i University and the following results were obtained.

Visualization of information is one of the new ways to convert information into image format in order to better understand information. Directly, without any practical instructions to receive their answers, visualization in the design of the interface can provide facilities and capabilities such as visibility of the state of the system, conformity between the system and the real world, monitoring and ease of use, compatibility. And using benchmark patterns, the ability to prevent errors, flexibility and effectiveness of use, artistic design and beauty observance, helping to better identify the user, identifying problems and the possibility of repairing errors, helping and providing documented explanations (Azadi ahmadabadi, 2014). The present

study was conducted to identify the components of information visualization in user experience in visual and graphical elements of digital library software system of Allameh Tabataba'i University and the following results were obtained.

The common problems of users in this research are their lack of awareness in how to use advanced search and its application, and therefore spending more time trying to do the information process with more time, so that they preferred to be accompanied by a brief and useful visual guide from the time they entered the website. The elements presented in this case are in accordance with the information visualization checklist in the research background, which has not been observed in the design of visual elements .

The most important suggestion that is prioritized for the home page of the Digital Library of Allameh Tabataba'i University is the need to clear some visual elements that affect the user's focus in finding functional sections, especially simple and advanced search, digital resources, types of templates. Persuade the department. The presence of an animated banner can be attractive, but if it is located in a more suitable size and place and its space is allocated to the search section. As follows, the suggestions are expressed:

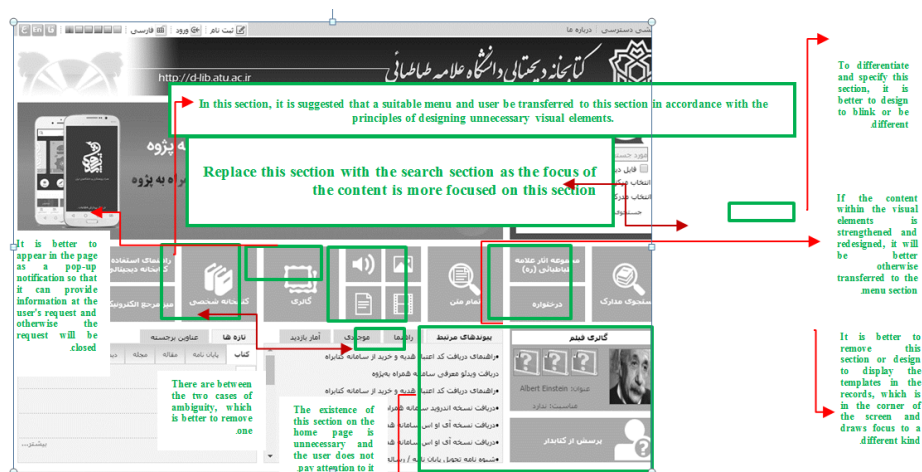


Figure 4 – The proposed model of the digital library of Allameh Tabataba'i University

In the search page, it is suggested that, along with the items mentioned in Figure 4 of the empty spaces, optimal and appropriate uses are

considered to place the guiding or guide elements so that the user can quickly and easily access the desired sections. They have this section, but they have forgotten which part it is located, to have a reminder, and for those who do not need to study this reminder, it can be rejected .



Figure 5- The proposed pattern of the digital library search page of Allameh Tabataba'i University

In the findings page, it is suggested that along with the items mentioned in Figure 5, we make sure to pay attention to how the information is displayed, because according to the review of the texts and information websites, an offer such as ontology-based display for related topics, related authors and related publishers can be considered. The topic related to the searched keyword is a subject and what follows to the user without killing time only by viewing the image and easy understanding, without reading all the text characters, refers to his/her desired section . Show distinction in the visual display and the size of the authors will be in visual form, respectively, the number of works around him. The offer will also be true for the relevant publishers section.



Figure 6- The proposed pattern of findings page of the Digital Library of Allameh Tabataba'i University

Since visualization provides the user with a faster understanding of the volume of information and allows him to access a certain volume of data with the way he or she is displayed according to his or her perceptions, the positive effect of visualization on the user experience and the quality of his performance in the digital library to access the required resources is not covered and is an influential factor in the user's information behavior.

References

- Azadi Ahmadabadi, Ghasem (2014), Visualization of information and its application in the field of knowledge information science, *knowledge and information management*, 1(4):97-111[In Persian]
- Doroudi, F. and Mohammad Alipour, N. (2013) The Role of Visualization in Information Retrieval. *National Journal of Library and Information Organization Studies*, 24(4):154-173[In Persian]
- Doroudi, Fariborz, (2009), Application of Information Visualization Techniques and Methods and the Effect of Visual Literacy in Educational Activities, *Journal of Educational Innovation*, 8(30):105-138[In Persian]
- Doroudi, Fariborz, (2015), Information Visualization: Basics and Applications, *Journal of Science and Information Technology*, 23(4):103-126[In Persian]
- Rajabali Begloo and Fattahi, Rahmatollah (2016), User Experience in Interaction with Digital Library Systems in Iran: Shortcomings and Expectations, 1st International Conference on Interactive Information Retrieval[In Persian]
- Zerehsaz, Mohammad, (2014), The Effect of Skill Capabilities on The Formation of Users' Navigation Behavior in The Information Process of Digital Library, *Journal of Information processing and Management*,29(3):817-838 [In Persian]
- Zerehsaz, Mohammad; fatahi, Rahmatollah and Sanatjou,Azam (2015), Digital Library Users' Guide Behavior: Influential Psychological Factors Based on The Theory of Planned Behavior, *National Journal of Library and Information Organization Studies*,26(4): 13-28[In Persian]
- Norouzi, Yaghoub and Soltanali Dastjerdi, Hamideh, (2015), Expected Priorities of Users from the User Interface Page of the Digital Library Studied: National Library and Archives Organization of The Islamic Republic of Iran, *National Journal of Library and Information Organization Studies*,26(2):39-52 [In Persian]