

Exploring the Elders' Information Needs on Home-Based Care: A Community Service Perspective

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Abstract. It is predicted that by 2030 China will become a country with the highest degree of population aging in the world. Information-based eldercare pattern is the direction for future development of eldercare. Through construction of a hierarchical model of the elders' information needs, in-depth analysis of their contents, and questionnaire survey with the elders, it has been found that many items of information needs are highly recognized by the elders. Cross statistical analysis indicated that information needs in both safety and emotional categories showed significant differences between the gender groups, while those in both physiological and self-actualization categories showed significant differences between the age groups. According to the research results, recommendation is put forward in the end of the paper on design and construction of information-based eldercare platform to help the elder users promote their user experience and information skills.

Keywords: Elderly · Community service · Information-based eldercare · Information needs

1 Introduction

It is estimated that China will enter medium-degree aging society in 2021–2030, and will gradually become a highly aging society, with an average 5.22 million additional elders per year between 2031 and 2050. The above data shows that the degree of China's population aging is constantly accelerating, and that the eldercare pattern is beginning to transit from home-based to community-based eldercare. With information-based community eldercare service as China's mainstream eldercare pattern in the future, the trend of information-based eldercare service will have far-reaching impact on various trades of the society.

Now that the information-based eldercare service has come, in the field of design, close attention should be paid to the needs the elder users have, and the hierarchy and features of their needs. This paper is divided into six parts. Part 2 is literature review of relevant research. In Part 3, the elders' needs are deduced hierarchically, and the model of the elders' information needs is constructed, both according to Maslow's hierarchy of needs. Part 4–5 discusses the questionnaire survey study on the elders' information

needs. Part 6 looks deeper at the information needs of the elders through statistical analysis. Part 7 gives recommendation on design of information-based eldercare.

2 Literature Review

Current research on the elders carry out studies mainly from the perspectives of the following three disciplines: medicine, psychology, and sociology. Medical and psychological researches focus on the elders' physiological and psychological problems, while sociology studies mainly their social behavior. As this paper discusses the elders' informational needs in community service, the research results currently available are reviewed from the aspects of studies on the elders' needs and informatization of community service.

As a result of the global trend of population aging, research on needs of the elders has caught wide attention among the scholars. Some investigated on the elders' needs of different categories and their degree of life satisfaction through empirical study [1]. Some studied the elders' behavior features, and pointed out the types of services to be provided to them based on these features [2]. Some think that daycare service or housework assistance not only solve the problem of the elders' physiological needs but also help alleviate the psychological burden of their families in looking after them [3].

Some investigated particularly on community care and medical security for the elders based on the characteristics of their needs in medical treatment and care. It was pointed out that community care would certainly become the trend for eldercare, while the elders still had a great deal of difficulties in getting community service and centralized medical service [4]. Some of the scholars think that the users' unfulfilled information needs have been the major obstacle to the development of informatization in community service [5]. Some researches concerned with informatization of home-based eldercare are limited to health and safety aspects. In this study the features of information needs of the elders were understood by carrying out survey with the elders from chosen communities, and making statistical analysis on the survey data.

3 Maslow's Hierarchy of Needs Theory

A hierarchical model of the elders' information needs was constructed in this paper according to Maslow's hierarchy of needs, to classify the information functions into categories. Through methods of questionnaire and mathematical statistics, investigation and data analysis on information needs in home-based eldercare were carried out using questionnaires that had passed reliability and validity tests.

Maslow's hierarchy of needs is one of the important theories of the behavioral science. This theory, which classifies human needs into five levels, i.e. physiological, safety, belonging and love, esteem, and self-actualization, has won wide recognition, and is one of the basic theories of various behavioral science studies. Obviously, we can deduce the elders' needs with the help of Maslow's theory on hierarchy of general needs.

3.1 Hierarchical Model of the Elders' Information Needs

On the basis of Maslow's hierarchical model of needs, the hierarchical needs of the elders were analyzed from the perspective of community service information, and so were obtained the hierarchical model of the elders' information needs (Fig. 1). The model divided the elders' needs into the following five categories: 1. physiological information needs including clothing, food, aboding, travelling, and daily care; 2. safety information needs, covering medical care and old-age support policies; 3. emotional information needs, including information on relatives and friends and group activities; 4. esteem information needs, including both self and social evaluation; 5. self-actualization information needs, including knowledge, skills, and post of duty.

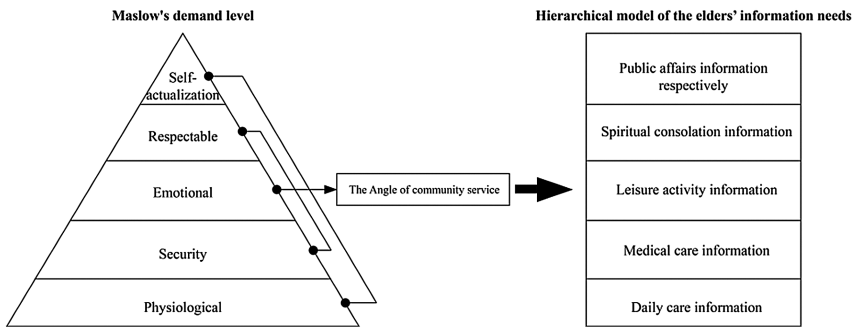


Fig. 1. Hierarchical model of the elders' information needs

The five categories were subdivided to get the information needed at high frequency by the elders (Fig. 2). According to the hierarchical model of the elders' information needs, this research's investigation contents were classified into the following five categories of information: life care, medical treatment & health care, leisure activity, spiritual consolation, and public affairs.

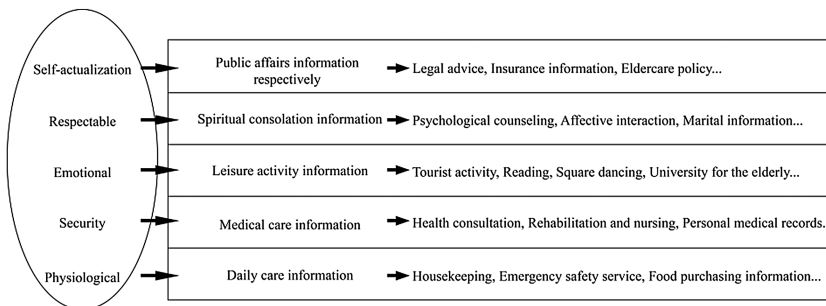


Fig. 2. High frequency elderly demand information

4 Research Design

According to the hierarchical model of the elders' information needs, the questions in the questionnaire, 19 in total, were divided into 5 types. In designing of the questionnaire, we defined first the object and contents of the survey, and then the respondents to the investigation. As the population under the investigation was the elders living at home, before carrying out the big sample investigation, trial visit was done on part of the elders, and the then questionnaires were revised, supplemented, and improved according to the questions emerged in the trial visit, forming the final, complete questionnaire.

The main body of the questionnaire focuses on the information needs in five categories: life care, medical treatment & health care, leisure activity, spiritual consolation, and public affairs. Apart from that the elders were asked how well they would accept the information-based community eldercare service platform.

The respondents of this investigation were urban elders living at home, who were males 65 years or older, and females 60 years or older. Three representative communities were chosen from Nanjing. The three communities' economic status all ranked close to the top among all communities of the whole city. In those communities, 90 questionnaires were distributed, 78 of them were back in total, among which 65 were valid ones after sorting out. The respondents included 30 males and 35 females, or 34 under 70 years old, and 31 of 70 years or older.

4.1 Reliability and Validity Tests of the Questionnaire

As questionnaire survey was the major means for this research, with a view to ensure objectivity and accuracy of the data obtained, we put the questionnaire reliability and validity study in the first place. In the field of social and scientific research, it is generally considered that for a scale or questionnaire with a good reliability coefficient, the reliability coefficient of the total scale is preferably above 0.80, while 0.70–0.80 is considered acceptable. For the scales for various dimensions, their reliability coefficient is preferably above 0.70, while 0.60–0.70 is considered to be acceptable; at the same time, during the reliability test, the corrected item total correlation coefficient (CITC coefficient) value was also considered. Any items whose CITC value was lower than 0.50 were deleted, until the CITC values of all items were greater than 0.50. Meanwhile, should any deletion of a variable be found out to have made the Cronbach α coefficient of the whole dimension higher, then the question item concerned would be deleted to improve the internal coherence of the dimension [6].

The reliability and validity of the questionnaire on information needs of the home-based elders were analyzed with SPSS software. The analysis results showed that the Cronbach α value of information under life care, medical treatment & health care, leisure activity, spiritual consolation, and public affairs categories were 0.705, 0.720, 0.786, and 0.768 respectively, all greater than 0.70, and the CITC coefficient values of the question items corresponding to various information needs were greater than the required value 0.50 without exception, indicating that the questionnaire compiled had good reliability (Table 1).

Table 1. Factor loading of questionnaire questions about information needs

Questions	Daily care	Medical care	Leisure activity	Spiritual consolation	Public affairs
Housekeeping	0.437	0.010	0.010	0.008	0.096
Maintenance service	0.821	0.168	0.041	-0.320	-0.221
Catering service	0.765	0.093	0.167	0.093	-0.161
Emergency safety service	0.517	0.130	0.086	0.133	0.125
Daycare center service	0.679	0.133	0.006	0.233	0.017
Food purchasing information	0.702	0.180	0.112	-0.108	0.149
Health consultation	0.105	0.671	0.130	0.047	0.026
Rehabilitation and nursing	0.232	0.708	0.132	0.082	0.267
Personal medical records	-0.131	0.502	0.122	-0.181	0.076
Tourist activity	-0.062	-0.021	0.569	0.011	0.142
Reading	0.276	0.276	0.632	0.037	0.078
Square dancing	0.326	0.143	0.760	-0.028	0.233
University for the elderly	-0.232	0.123	0.725	0.014	0.015
Psychological counseling	0.032	0.155	0.042	0.573	0.123
Affective interaction	-0.070	0.087	0.315	0.623	0.084
Marital information	0.015	-0.011	0.015	0.503	0.095
Legal advice	-0.020	0.066	0.066	0.174	0.685
Insurance information	0.157	0.156	0.024	0.205	0.798
Eldercare policy	0.032	0.096	0.101	0.084	0.541
Eigenvalue	3.482	2.246	1.634	1.342	1.132
Explained variance/%	21.652	19.540	18.043	14.630	11.534
Accumulative explained variance/%	21.652	41.192	59.235	74.865	86.399

Exploratory factor analysis was performed on the questionnaire items to test its construct validity. The analysis data showed that the KMO value was 0.778, which was greater than the required value of 0.70. At the same time, the result of the Bartlett test of sphericity was 0, indicating that the sphericity test was “significant”. The null hypothesis that the correlation coefficient was the unit matrix was rejected, indicating that the correlation coefficient could be used as the classified factor in the factor analysis.

According to the principle of the eigen value being greater than 1, factor extraction was done by varimax rotation. Five groups of combinations were obtained, as shown in Table 1. The five groups of combinations represented respectively the following categories of information function: ‘life care’, ‘medical & health’, ‘leisure activity’, ‘spiritual consolation’, and ‘public affairs’. Their cumulative variance explained was

86.399%. At the same time, the factor loading of various question items were all greater than 0.50, and no question items spanned two groups of dimensions, showing good discriminant validity.

5 Data Analysis

5.1 Basic Analysis of the Investigation Results

Descriptive statistical analysis was performed on the data according to the investigation results. The results are shown in Table 2.

In the six question items in life care information function, to four of them more than 40% gave the answer 'recognized', which were household management service information, emergency safety service information, and maintenance service information, in the order of proportion. The preliminary investigation showed that household management service was one of the most highly demanded services by the home-based elders.

Table 2. Descriptive statistical table of questionnaire data

Type of group	Questions	Recognized (%)	Ordinary (%)	Not recognized (%)
Daily care	Housekeeping	77.6	11.5	10.9
	Maintenance service	69.2	17.5	13.3
	Catering service	50.7	38.6	10.7
	Emergency safety service	70.5	20.4	9.1
	Daycare center service	35.2	29.7	35.1
	Food purchasing information	25.3	43.2	31.5
Medical care	Health consultation	34.7	53.5	11.8
	Rehabilitation and nursing	42.6	30.6	26.8
	Personal medical records	27.5	34.6	37.9
Leisure activity	Tourist activity	59.7	30.5	9.8
	Reading	30.5	35.7	33.8
	Square dancing	70.1	11.6	18.3
	University for the elderly	60.8	12.6	26.6
Spiritual consolation	Psychological counseling	36.4	43.7	19.9
	Affective interaction	57.3	31.9	10.8
	Marital information	23.7	38.3	38
Public affairs	Legal advice	64.2	25.7	10.1
	Insurance information	65.6	27.8	6.6
	Eldercare policy	58.4	30.5	11.1

As they grow older their physiological functions constantly decline, therefore they need assistance from household management services to handle many of their daily affairs. Emergencies, though of occasional occurrence, for instance a fall of an elder at home, could cause immeasurable consequences if the dangerous situation is not handled in time. Therefore, emergency safety service was also recognized by the elders. To other four question items, including catering service information, daycare center service information and food procurement information, most elders ranked them as 'ordinary' in terms of degree of recognition. The demand for these services seemed low, however they might be influenced by other factors. More relevant discussions will be made later in line with the crossover statistical analysis.

In the three items in medical treatment & health care information functions, to most of them such as health consultation and personal medical archive, most elders gave the answer of 'ordinary' in terms of degree of recognition. This showed that, in general, the elders' understanding and receptivity of health care still remained with the tradition of mainly relying on medical treatment, with weak sense of preventative health care. This reflected that the elders were highly dependent of the professional medical institutions, and would be likely to have difficulties in getting medical service in the eldercare service links.

In the four questions of leisure activity information function, to tourist activity, plaza dancing, and elderly university, great majority of the respondents give the answer 'recognized', the sequence being plaza dancing, elderly university, tourist activity, and book reading according to the proportions. It is thus obvious that most elders were in agreement in their needs of and attention to cultural and leisure activities, indicating their high demand of leisure activities. The communities should enhance community cultural and leisure service items, and utilize information application to boost the quality of eldercare by the community.

In spiritual consolation information function, emotional exchange and psychological counselling were highly recognized by the elders. It indicated that the elders' receptivity to spiritual consolation services were still in the initial stage, and great majority of them could not accept this type of service. The home-based elders are relatively lonely, and the current company & chat service can alleviate their feeling of loneliness. Home-based elders whose families are not with them for long need suitable spiritual consolation services to relieve their feeling of loneliness.

In the public affairs information function, all three question items were highly recognized by the elders, in the sequence of insurance information, legal consulting, old-age support policies according to the proportion. It indicated that the home-based elders had an urgent need of public affairs service. Although they chose home-based eldercare, they paid close attention to the welfare provided by the government and insurance benefit provided by the society, which was in line with China's social aging problem of growing old before becoming rich and the social reality of the great burden of eldercare that relied solely on the families.

About how well they would accept the information-based community eldercare platform, most elders expressed their hope that such a platform would provide them

with better service. However, many of them also expressed their concerns over how to use the platform, how complicated the operation of the platform would be, and the cost of the service. It is thus clear that multiple aspects have to be taken into consideration in implementing the information-based community eldercare platform.

5.2 Crossover Statistical Analysis on Home-Based Eldercare Service Information Need and Gender and Age

Due to the heterogeneity of the elder population, which was considered in the research, the information needs of the elders might vary among gender and age groups. The functional information and gender and age groups were cross analyzed respectively using data analysis software, to screen more significant differences, which are shown in Tables 3 and 4.

Table 3. Statistical table of gender difference in information needs

Type of group	Gender	Recognized (%)	Ordinary (%)	Not recognized (%)
Psychological counseling	Male	8.1	47.8	44.1
	Female	50.6	39.6	9.8
Legal advice	Male	45.7	38.6	15.7
	Female	74.3	13.9	11.8
Square dancing	Male	3.2	10.2	86.6
	Female	72.8	7.4	19.8
Insurance information	Male	82.4	12.4	5.2
	Female	55.6	39.4	5

Table 4. Statistical table of age difference in information needs

Type of group	Age	Recognized (%)	Ordinary (%)	Not recognized (%)
Tourist activity	≤ 70	58.1	33.1	8.8
	>70	2.8	29.3	67.9
Catering service	≤ 70	20.3	31.5	48.2
	>70	60.9	20.2	18.9
Rehabilitation and nursing	≤ 70	18.9	30.5	50.6
	>70	70.1	10.5	19.4
Health consultation	≤ 70	13.2	26.5	60.3
	>70	52.8	10.2	37
Daycare center service	≤ 70	17.9	40.4	41.7
	>70	63.6	10.2	26.2

6 Result and Discussion

6.1 Information Needs Categories with Significant Differences Between Different Genders

1. Gender and differences in needs of psychological counseling information

Analysis based on gender groups suggested that the gender factor played a significant role in needs of psychological counseling information. The male elders' answers to this item were 'recognized' (8.1%), 'ordinary' (47.8%), and 'not recognized' (44.1%), while the female elders' answers to the same were 'recognized' (50.6%), 'ordinary' (39.6%), and 'not recognized' (9.8%). In the chi-square testing, the Pearson square value was 31.25, $P = 0.00 < 0.05$. The null hypothesis of the chi-square testing was equal proportions. The significance level being lower than 0.05 meant that the null hypothesis was false, therefore the elders of different genders had significant difference in their needs of psychological counseling information. It is thus clear that female elders recognized and received psychological counseling significantly better than males did. During the questionnaire survey, female respondents' conversation contents were richer than the males, and the females were more willing to exchange with others than the males were.

2. Gender and differences in needs of legal consulting information

Analysis was performed based on gender groups. The male elders' answers to this item were 'recognized' (45.7%), 'ordinary' (38.6%), and 'not recognized' (15.7%), while the female elders' answers to the same were 'recognized' (74.3%), 'ordinary' (13.9%), and 'not recognized' (11.8%). In the chi-square testing, the Pearson square value was 7.35, $P = 0.025 < 0.05$. Therefore, the elders of different genders had significant difference in their needs of legal consulting information. The results showed that female elders recognized better the policy and legal information needs than the males did, which was probably related to the female's situation as the disadvantaged population compared with the male.

3. Gender and differences in needs of plaza dancing information

Analysis based on gender groups suggested that the gender factor played a significant role in needs of plaza dancing information. The male elders' answers to this item were 'recognized' (3.2%), 'ordinary' (10.2%), and 'not recognized' (86.6%), while the female elders' answers to the same were 'recognized' (72.8%), 'ordinary' (7.4%), and 'not recognized' (19.8%). In the chi-square testing, the Pearson square value was 7.34, $P = 0.026 < 0.05$. The null hypothesis of the chi-square testing was equal proportions. The significance level being lower than 0.05 meant that the null hypothesis was false, therefore the elders of different genders had significant difference in their needs of plaza dancing information. It showed that female elders tended to have higher recognition than the males did in participating plaza dancing activity.

The Chinese male elders tended to choose leisure activities of their personal preference, while the females tended to take part in group leisure activities.

4. Gender and differences in needs of endowment insurance information

Analysis based on gender groups suggested significant gender difference in needs of endowment insurance information. The male elders' answers to this item were 'recognized' (82.4%), 'ordinary' (12.4%), and 'not recognized' (5.2%), while the female elders' answers to the same were 'recognized' (55.6%), 'ordinary' (39.4%), and 'not recognized' (5%). In the chi-square testing, the Pearson square value was 6.59, $P = 0.037 < 0.05$. Therefore, the elders of different genders had significant difference in their needs of endowment insurance information. The investigation results showed that among the samples investigated, the male elders attached more importance to the needs of endowment insurance information than the females did.

Through the above data analysis, it was understood that the female elders showed significantly higher recognition and acceptance level in psychological counseling than the males did; the females recognized better the policy and legal information needs than the males did; while the males attached more importance to needs of endowment insurance information than the females did; and the two gender groups had great difference in recognition level of leisure activity. Needs of safety and emotional information categories showed significant differences in gender.

6.2 Information Needs Categories with Significant Differences in Age

The survey sample was divided into two sub-sample groups according to the age variable, with below 70 years as the young elders, and 70 years or older as the old elders. Cross statistical analysis was performed on each question item and the age group variable. The information needs with significant differences were analyzed as follows:

1. Age and difference in needs of tourist activity information

Cross analysis was performed on age and tourist activity information. Significant differences were found between the two age groups. The answers to this item from the young elders below 70 years were: 'recognized' (58.1%), 'ordinary' (33.1%), and 'not recognized' (8.8%), while the answers to this item from the old elders 70 years or older were 'recognized' (2.8%), 'ordinary' (29.3%), and 'not recognized' (67.9%). In the chi-square testing, the Pearson square value was 37.02, $P = 0.00 < 0.05$. The null hypothesis of the chi-square testing was equal proportions. The significance level being lower than 0.05 meant that the null hypothesis was false, therefore the elders of different age groups had significant difference in their needs of tourist activity information. The result showed that the young elders needed more tourist activity information. The major reason behind it, we think, was that the decline of physical functions with the age increase affected the elders' choice in travelling and touring.

2. Age and difference in needs of catering service information

Cross analysis was performed on age and catering service information. Significant differences were found between the two age groups. The answers to this item from the young elders below 75 years were: 'recognized' (20.3%), 'ordinary' (31.5%), and 'not recognized' (48.2%), while answers to this item from the old elders 75 years or older were 'recognized' (60.9%), 'ordinary' (20.2%), and 'not recognized' (18.9%). In the chi-square testing, the Pearson square value was 15.064, $P = 0.00 < 0.05$. Therefore, the elders of different age groups had significant difference in their needs of catering service information. With the increase of age, higher and higher proportion of the elders attached importance to their choice in catering service.

3. Age and difference in needs of recovery care service information

Cross analysis was performed on age and recovery care service information. Significant differences were found between the two age groups. The answers to this item from the young elders below 75 years were: 'recognized' (18.9%), 'ordinary' (30.5%), and 'not recognized' (50.6%), while answers to this item from the old elderly 75 years or older were 'recognized' (70.1%), 'ordinary' (10.5%), and 'not recognized' (19.4%). In the chi-square testing, the Pearson square value was 7.137, $P = 0.028 < 0.05$. Therefore, the elders of different age had significant difference in their needs of recovery care service information. With the increase of age, there was the trend of growing proportion of the elders who attached importance to their choice in recovery care service.

4. Age and difference in needs of health consultation information

Cross analysis was performed on age and health consultation information. Significant differences were found between the two age groups. The answers to this item from the young elderly below 70 years were: 'recognized' (13.2%), 'ordinary' (26.5%), and 'not recognized' (60.3%), while answers to this item from 70 years old or older were 'recognized' (52.8%), 'ordinary' (10.2%), and 'not recognized' (37%). In the chi-square testing, the Pearson square value was 15.32, $P = 0.00 < 0.05$. Therefore, the elders of different ages had significant difference in their needs of health consultation information. With the increase of age, higher and higher proportion of the elders attached importance to their choice in health consultation information.

5. Age and difference in needs of daycare center service information

Cross analysis was performed on age and daycare center service information. Significant differences were found between the age groups. The answers to this item from the young elders below 70 years were: 'recognized' (17.9%), 'ordinary' (40.4%), and 'not recognized' (41.7%), while answers to this item from the old elders 70 years or older were 'recognized' (63.6%), 'ordinary' (10.2%), and 'not recognized' (26.2%). In the chi-square testing, the Pearson square value was 15.74, $P = 0.00 < 0.05$. Therefore, the elders of different age groups had significant difference in their needs of day care center service information. With the increase of age, higher and higher proportion of the elders attached importance to their choice in daycare center service information.

Through the above data analysis, we got to understand that: the old elders 70 years or older had more needs in catering service, recovery care, health consultation, and

daycare center service information; with the increase of age, they attached growing importance to choices in daycare center service, health consultation, recovery care information; and that age made a significant difference in physiological and self-actualization information needs.

7 Conclusions

It was found in the investigation that the following twelve community service information functions for eldercare were highly recognized by the elders: household management service information, maintenance service information, catering service information, emergency safety service information, recovery care information, tourist activity information, plaza dancing information, elderly university information, emotional exchange information, legal consulting information, insurance information, and old-age support policy information.

According to the results of the investigation, the following recommendation was put forward on construction of the information-based community service for home-based elders: The community eldercare service organizations or businesses should provide the home-based elders with the service information that are highly recognized and urgently needed by the elders, for example: household management service information, emergency safety service information, maintenance service information, endowment insurance information, etc. For the service contents whose recognition levels by the elders were 'ordinary' or 'not recognized', for example emotional exchange, psychological counselling, recovery care service information etc., relevant publicity and guidance will be necessary. For information-based service needs related to age and gender, there should be special column dedicated to gender service and a special service space dedicated to the old elders.

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