The research on the design and implementation of map elements classification for "Mapworld of Nanjing" (middle school edition)

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1. Introduction

As an important content of construction of "Smart Nanjing", "Mapworld of Nanjing" was firstly connected to the National Node in May ,2012,taking the lead in realizing the three levels of public geographic information interconnection between the nation, the province , and the city.

In order to promote the national brand -"Mapworld of Nanjing", and make it more competitive than other popular electronic maps, the research team believes that one of the best methods is to take the lead in producing different versions of the map according to the need of different groups of people. The middle school students who are the most dynamic and like fresh things, may have great demand for and interest in the map. Through the comprehensive analyses of literature retrieval results, the research team decided to create the middle school student "Mapworld of Nanjing" based on the students' perspective.

2. Research purpose and idea

Through the social surveys and analyses, the research team accomplished the design of map classification elements in "Mapworld of Nanjing" (middle school edition), optimized and highlighted the group characteristics of middle school students in map interest point classification system, symbol design and the importance weights of design, enhanced the availability and competitiveness of the map service.

3. Research method

Making social surveys by means of the combinations of literature survey, questionnaire and expert interview method, the combinations of stratified and random sampling, the combinations of closed and open questionnaire, and the combinations of electronic and paper investigation; Conducting data collections and statistical analyses by means of the

combinations of qualitative and quantitative; Verifying the science and feasibility of the design by means of the combinations of theory and practice.

4. Research route

This study is divided into five stages: prophase research, sampling investigation, map elements investigation, Results application, and summary and prospect.

5. Fundamental condition of social surveys

The social surveys include two parts: sample surveys and students map elements investigation. Through investigations of 30 experts on map production and research as well as the middle school educators, learning the influence degree that differences between urban and rural areas, ages, genders, school backgrounds, administrative districts and other factors in the map so as to solve the problem of acquiring the samples. The latter is based on the former research results. Through the investigations and comparisons between six grades of Nanjing Foreign Language School (hereinafter referred to as the "NFLS") and two grades of Nanjing No.3 Senior Middle School, Wenchang district (hereinafter referred to as the "NJSZ") -about 40 students in each grade were selected, learning the students' preferences for map elements classification, their sorting by importance, and symbol designs so as to solve the designing problems.

6. Survey result and analysis

6.1 How to show the characteristics of school edition map?

Middle school students pay close attention to some particular geographic elements. For example, compared with the ordinary people, they pay more attention to the bookstore instead of tea house. Hence the manifestation of relevant points of their interests is different from that of public in the map. In addition, students may enjoy vivid symbols, possibly have different views on the classification of interest points. For example, they do hope to have a classification concerning with their own life and study. Therefore, this study focuses on the weight of map elements, classifications and symbols to investigate.

6.2 How to carry out the investigation?

Both copies of the questionnaire include three parts: introduction, body and conclusion, striving to be concise, scientific, artistic and integrated. Each respondent uses a closed questionnaire to score the weights of surveys; For classifications and symbols, each respondent uses both closed and open questionnaire. Firstly, the existing classifications and symbol satisfactions are surveyed, then the proposals submitted by students are collected, and finally the design of classifications and symbols is perfected by the research team.

6.3 How to determine the sampling?

Through the expert investigation, among all the characteristics which may cause different attitudes of middle school students toward human geography matters in "Mapworld of Nanjing", the important degree is as follows: the differences between urban and rural areas, age, learning ability, family background, innate character, school style, gender, different urban administrative districts .Considering the present limited purchasing power of electronic products and the imperfect network infrastructure in rural areas, the preference of rural middle school students is ignored. Among the eight items, the differences of school style and urban administrative districts rank third and first from the bottom respectively. This means that, when deciding how to obtain samples as far as the two items are concerned, the only investigation of NFLS is reasonable. The research team also selected NJSZ to verify its correctness.

6.4 What is the major adjustment in elements classification of the map?

Through the analyses of classification satisfaction, the original 13 items and 106 subitems of classification are adjusted to 14 items and 123 subitems. The item of extracurricular practice is added, in which the science and technology museum, library, bookstore and monument are added and the museum, memorial hall and exhibition hall are separately marked in order to strengthen the unique needs of middle school students.

6.5 Are the judgments on the importance of the elements in the map the same?

Do the judgments differ greatly between middle school students in different grades? Through the investigation and study, in students' eyes, the importance degree is different according to different geographic elements in Mapworld of Nanjing. For example, the categories of extra-curricular practice which is closely related to middle school students score higher in weights at each grade, while the categories of securities agency, bathhouse and beauty salon score lower. The surveys show that the judgments on the importance of different elements between each grade of NFLS are consistent, as shown in figure 1. And this conclusion is applicable to the items of gender and different urban administrative districts, further verifying the correctness of the experts judgments. So, only one version of Mapworld of Nanjing for middle school students needs to be completed without any subdivision.

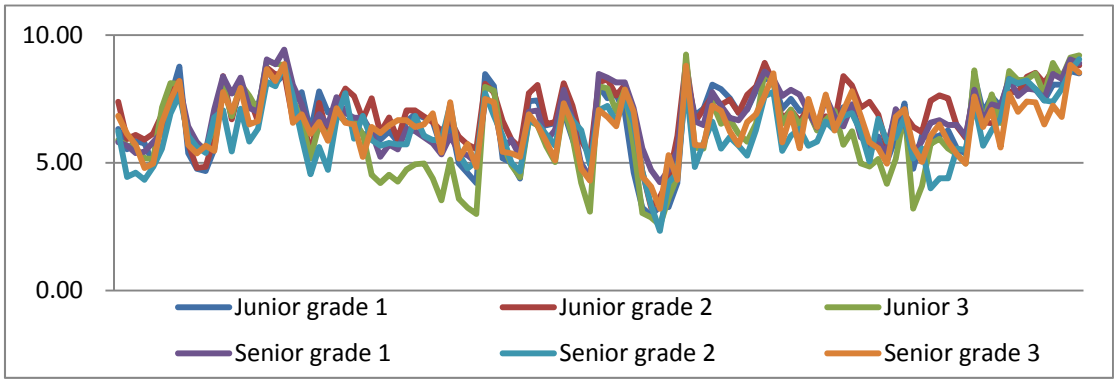

Figure 1. The diagrammatic sketch of map elements weights in the cognition of NFLS students

6. 6 What kind of symbols will need to be designed?

On the premise of meeting national map design requirements, two kinds of elements must complete their symbol designs: one is the new elements; the other is the existing elements whose satisfactions score lower than 60%, but weights score more than 6.5, including 33 elements such as subway station, bus line, botanical garden, toilet, museum and others.

6.7 Are survey results consistent between different schools?

Through the comparative analyses of survey results between NFLS and NJSZ, it can be clearly seen that different school students share greater similarity in the matter of classification systems, symbol designs and the importance weights of design. School difference has indeed little influence on the students' preferences to the different geography elements, further verifying that the sampling method in this study is reliable and reasonable, as shown in figure 2.

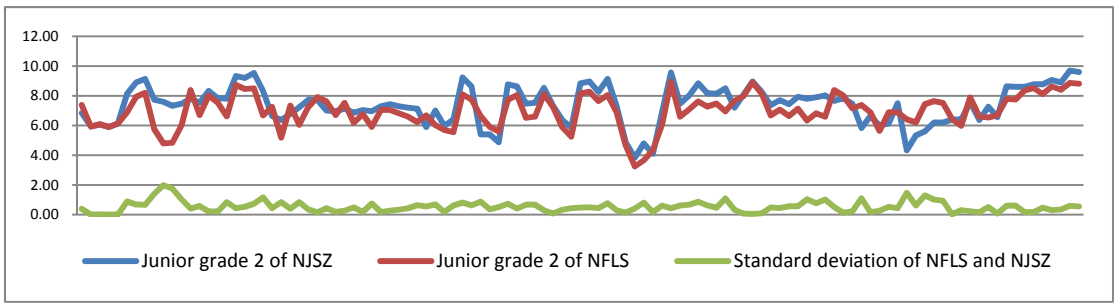

Figure 2. The diagrammatic sketch of map elements weights in the cognition of Junior Grade 2 students between NFLS and NJSZ

7. Research achievement

From the initial selection of projects, research plans, questionnaire designs, surveys, data acquisitions and analyses to the final project achievements, the research team carried out a series of work: questionnaire and recovery, mass data input, statistics and analyses, and summed up thousands of pages of research data and results including texts, tables, drawings, photos, logs,etc. Based on the above achievements, the testing website of "Mapworld of Nanjing" (middle school edition) has been operated, proving that the research achievements of this project is scientific, reasonable, and feasible. As shown in Figure 3 and figure 4.

Figure 3. Part "Mapworld of Nanjing" (middle school edition) of Hexi District

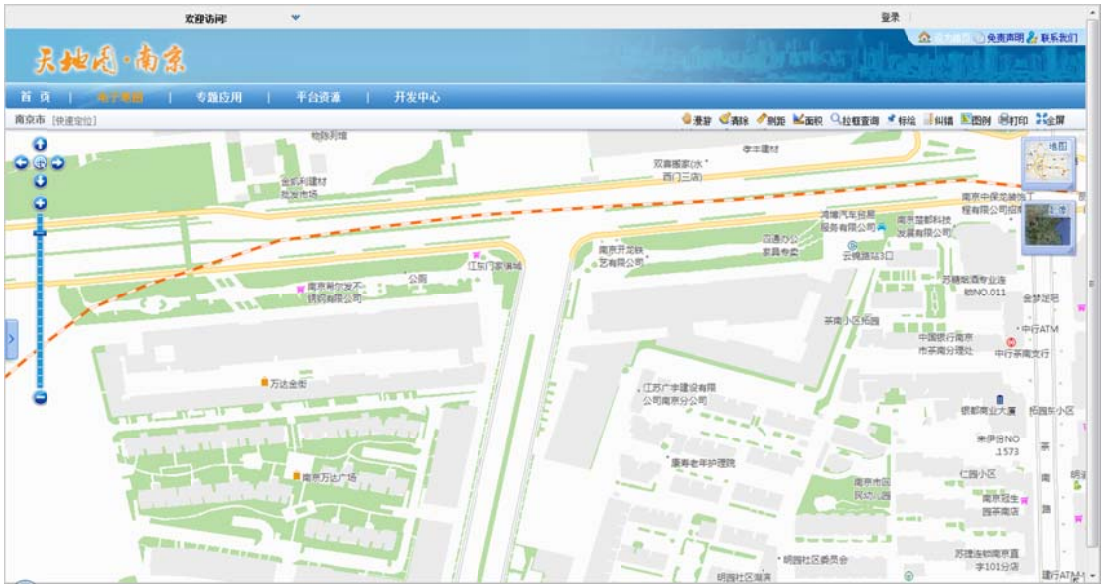

Figure 4. Part "Mapworld of Nanjing" of Hexi District

8. Summary and prospect

In this study, the conception of "Mapworld of Nanjing" (middle school edition)was firstly forwarded nationwide; the service system of "Mapworld of Nanjing" was improved; the social surveys concerning the interest point classifications, factor weight evaluations, consultations for symbol satisfactions ,and personalized symbol designs were conducted; The interest point classifications, the element weight settings, and the symbol designs for the map were created and developed based on the achievements of the study. In view of the upcoming Asian Youth Olympic Games in 2013 and Youth Olympic Games (YOG) in 2014, the research team is now contacting with the mapping institution to construct the "Mapworld of Nanjing" (YOG edition) based on the middle school edition.

9. References

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Note: this project won the first prize of the twenty-fourth Jiangsu Youth Science and technology innovation contest