

Thinking of the Teaching Reform of GIS Course in Urban Planning Major

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Abstract—Urban planning education aims to train qualified personnel to meet the needs of planning work. In response to the new requirements of urban planning decision-making and management development, many colleges and universities have begun to realize the necessity of introducing GIS application teaching in urban planning professional education. The study of teaching models combined with urban planning has become an important direction in the reform of modern urban planning teaching methods. Based on the necessity of combining GIS with planning and the advantages of GIS, this paper discusses the application of GIS technology in urban planning and some problems in teaching, aiming to explore the current new period of social and economic development and the city under technical means. Planning education methods and reform of teaching content.

Keywords—urban planning major; GIS course; teaching reform;

I. INTRODUCTION

A geographic information system (GIS) is a system that collects, stores, analyzes, and disseminates information about a region on Earth. The system includes related hardware, software, data, personnel, organizations, and corresponding institutional arrangements". The "collection, storage, analysis and dissemination" is the four functions that a complete GIS must have, namely "input, storage, operation and analysis, expression output", which is the core of modern space technology. At the same time, in the field of urban planning, with the development of economy, society and population, the urbanization process of the world is accelerating. Urban planning based on traditional material spatial determinism is gradually exposing chaotic spatial layout, population expansion, environmental pollution, and housing crowding. Various problems. GIS can provide a new technology platform for urban planning, providing data, models, optimization plans and future architecture for planning decision-making, thereby improving the scientific nature of urban planning and realizing the effective allocation and rational arrangement of urban spatial resources. The advancement of the connotation and content of traditional urban planning.

At present, the application of GIS in the urban planning industry is lagging behind. Professionals in the planning and management leadership positions often do not have the

knowledge and skills in this field, and regard GIS as an immature new technology. With the development of the discipline of GIS and the development of urban planning disciplines, the application of GIS also puts forward corresponding requirements for the urban planning industry and personnel training. Urban planning teaching in the context of informationization has also begun to pay attention to the cultivation of students' comprehensive abilities. Students are required to be able to transplant and integrate all kinds of knowledge they have learned. The discipline needs to strengthen the advantages of traditional planning and design knowledge and skills training. Students are trained in the use of information technology to improve the overall ability of future planners. The examination contents and requirements of the "Application of Geographic Information System (GIS) in Urban and Rural Planning" are clearly listed in the National Registered Urban Planner Examination Syllabus[1]. In the "Evaluation Standards for Postgraduate Education in Urban Planning and Design of National Colleges and Universities", it is clearly stated that urban planning students need to "understand the application of new technologies such as computers and geographic information systems in urban planning".

At present, many university urban planning professions have successively opened GIS courses, and the proportion of planning professional teachers who have mastered this knowledge is too low[2]. The GIS application only appears in the GIS curriculum, and students have less opportunity to link innovation and entrepreneurship and social practice with GIS. The knowledge that is learned is difficult to integrate, and there are fewer application opportunities after work. The lack of senior professionals to pass, help, bring, and the knowledge and skills learned are easy to forget.

Therefore, at this stage, urban and rural planning education should gradually adjust the teaching content and methods, reflect the special characteristics of the profession, flexibly set the teaching content of the combination of GIS curriculum and innovative education and practical education, and focus on cultivating students' innovative consciousness and practical application ability. And promote the transformation of teaching achievements, and cultivate more innovative composite talents.

II. EXPERIENCE AND THINKING OF INNOVATIVE PRACTICE TEACHING BASED ON URBAN AND RURAL PLANNING TECHNOLOGY

With the advent of the era of “mass entrepreneurship and innovation”, it is a general trend to combine theoretical learning with innovation and entrepreneurship in the teaching process of colleges and universities[3]. The teaching practice of urban and rural planning new technology of Xiamen University's urban planning department adopts a step-by-step approach to gradually improve students' theoretical level and innovative practice ability[4]. In terms of content, innovative field research cases are used as carriers, from theoretical study to experimental practice. From individual training to comprehensive training, from innovation awareness training to entrepreneurial internship training; form, combining theoretical learning with innovative entrepreneurship projects, combining classroom learning with social practice, and building a platform for students' innovation and entrepreneurship development. The experience in GIS teaching reform is as follows.

A. Classroom teaching combined with innovation and entrepreneurship education and practical education

Establish a "computer-aided design", "planning and design software application", "urban and rural planning new technology GIS application", "graduation design" and other curriculum teaching system, at the same time combine curriculum teaching with innovation and entrepreneurship practice, guide students to complete college students' innovation and entrepreneurship projects, and participate in each Workshop and social practice.

B. Improve teaching methods and actively participate in teaching reform

Taking students as the main body, a wide range of teaching forms such as heuristic, discussion and case-type are widely carried out; taking the opportunity of participating in various teaching reforms, establishing a system of innovation and entrepreneurship for college students, infiltrating into practical teaching concepts, and constructing innovative entrepreneurship courses. The system, through the online teaching platform, carries out the teaching reform of the flipping classrooms such as MOOCs/SPOC, strengthens the cultivation of students' application ability, and achieves the organic combination of knowledge transfer and ability training. Prepare Your Paper Before Styling

C. Comprehensive practical courses to create solid professional skills

It broke the traditional model of “teaching in the past and training internship”, and cooperated with the Xiamen Planning Institute and other units to integrate practical projects into the curriculum. At the same time, the virtual simulation teaching platform was used to combine the virtual and real skills to create professional skills.

D. Innovation in application-oriented talent training

With the above-mentioned practical teaching concept innovation, through the construction of a new practice teaching

system, platform construction, teacher team and management system construction, as well as various practical teaching activities that are carried out in an orderly and effective manner and covering all aspects of teaching, try to create an effective training of applied talents. way.

Through the above teaching reform practice, students' ability to innovate and practice has been improved, and comprehensive quality has been cultivated in all aspects. By actively participating in various practical teaching activities, teachers not only improve their practical ability, but also pay more attention to teacher-student interaction, teaching and learning in classroom theory teaching, and constantly reform and innovate teaching organization forms, teaching methods, and teaching methods. Improve the teaching level and teaching quality.

III. THINKING AND EXPLORATION OF TEACHING REFORM OF GIS COURSE IN URBAN PLANNING MAJOR

A. Combining theory with practice and focusing on practice

The GIS is widely used in various industries and departments involving geography, land, environment, urban and rural planning, transportation and other spatial and geographic information[5]. Different departments have different research and even different definitions for GIS. The purpose of the GIS program in urban and rural planning is to enable students to develop the ability to apply GIS to solve practical problems in the planning profession based on the professional courses already in place[6]. Since the curriculum of urban and rural planning majors involves less content in computer, surveying and information science, and simply teaching GIS courses theoretically, planning students will feel that the content of the GIS course is boring and boring. Therefore, the teaching content and teaching methods of GIS curriculum should be combined with the characteristics of urban and rural planning professions. The main case-based teaching enables students to master the basic concepts of GIS, familiar with the processing, analysis and management of spatial data, to improve students' content of GIS courses. Acceptability and interest in learning.

GIS course teaching is generally divided into two parts: classroom teaching and practical teaching. Classroom teaching is based on the teaching of GIS theory. It is necessary to emphasize the basic concepts and methods of GIS, and it is not necessary to meet the depth and requirements of GIS students. Practice teaching is based on software training and curriculum design, with the basic operations of mainstream GIS software (such as ArcGIS) as the core, including basic computer operation and comprehensive computer operation. The basic computer operation is mainly to train students to be familiar with GIS software, including: familiar with GIS interface, spatial data collection and map editing, graphics and attribute data operations, spatial overlay analysis, buffer analysis, network analysis, DEM model, etc. Content. Comprehensive computer operation using case teaching methods, rational design of practical operation courses, training students to comprehensively use GIS tools and planning professional domain knowledge to solve practical problems in planning, so that students can deepen their use of software and

understanding of GIS basic theory in their application. The main contents of the experiment include: 1) evaluation of land use suitability; 2) site selection in urban planning; 3) excavation fill in planning; 4) terrain analysis and simulation in planning.

B. Building an open gis course

The technological era of rapid expansion of information has almost broken the closed state of all current courses in colleges and universities[7]. Course teaching is no longer limited to classroom teaching. It can use the functions of the network to realize the sharing and development of course content and curriculum resources. The core of the open GIS course is to intersperse the contents of the GIS course into the design course and closely integrate it with the design course[8].

In general, the curriculum design tasks of planning majors are heavier, and design courses are available almost every semester. At present, most colleges and universities in urban and rural planning generally only offer one GIS professional course. The class usually takes 32 to 48 hours. It is unrealistic to rely on the class time to make the students master the whole content of the GIS course. However, in the current national requirements to strengthen undergraduate basic education, to downplay the profession and to reduce the overall teaching time, it is unlikely to increase the class time of the GIS course, then strengthen the GIS curriculum and the design courses such as "master plan" and "detailed planning". Inter-connecting, interspersing part of the GIS course into the design course, can solve the problem of insufficient amount of time in the GIS course, extend the teaching content of GIS, and allow students to learn and use, and improve the planning of students using GIS. The ability to solve practical problems in the field. The teacher of the design course cooperates with the GIS course teacher, and can take a course in the design course. The GIS course teacher explains the analysis and application of the GIS related to the design. For example, in the "Urban Master Plan Design" section, the application of GIS and remote sensing in urban master plan surveys can be increased, the application of land use suitability evaluation and the application of site selection in the overall planning analysis, and The GIS analysis content is used as a plus factor for the design course scores to improve students' interest and enthusiasm in learning and applying GIS.

IV. TEACHING REFORM OF THE COURSE OF URBAN PLANNING AND DESIGN

The education of urban planning specialty in colleges and universities is generally divided into two parts: classroom teaching and practical teaching. In most cases, classroom teaching is mainly based on teachers' teaching theory. In the process of teaching this part of the content, it is necessary to express the new theory and technology in a form acceptable to the students, so that the teaching content and teaching means have novelty and progressiveness, and at the same time, the corresponding methodological content should be strengthened. In order to establish an organic relationship between theoretical teaching and practical application. Since GIS, a new technical means, plays a more and more important role in

urban planning, it has gone deep into several aspects, such as information management, present situation analysis, public facilities evaluation, land evaluation and site selection, etc. Strengthening its application teaching has also become an indispensable and important link in the cultivation of high-quality urban planning talents. Therefore, it is necessary to closely link the practical application of GIS in urban planning design and management, and explore the practical application of GIS in urban planning teaching and curriculum design. The combination of GIS in the course teaching of urban planning specialty can mainly play a role in two aspects: one is teaching assistance, that is, the introduction of GIS as a new teaching method into the course teaching, The method of using GIS software to teach specific teaching contents, such as the operation of spatial database, simple query and analysis assistance, is used to achieve the goal of auxiliary teaching and improving the effect of theoretical teaching. Second, the innovation of teaching content, mainly to highlight the application of GIS teaching, the use of GIS technology and research methods for urban planning management and planning analysis, as well as to improve the scientific planning program and other aspects of the ability. The related courses are mainly "GIS" course and "Urban Planning and Design" course. In teaching, attention must also be paid to maintaining the convergence of "GIS" course with "Master Planning", "detailed Planning" and other courses. Efforts should be made to make active use of learning and combine theory with practice, so that students can combine the application of information technology in practical projects of urban planning to meet the needs of the development of the information age. In the traditional training mode of urban planning professionals to meet the needs of material planning in China, the "GIS" course is mainly based on the introduction of general content, and lacks the ability training in methods and applications. It can no longer meet the needs of the education of urban planning talents in our country. Urban planning and management involves a large number of graphic data, documents and statistical tables related to land use, road route selection, construction engineering and so on. The spatial database established by GIS platform can completely describe the spatial phenomena and the formation of entities. The efficiency and standardization of urban planning management are greatly improved by carrying out graphic browsing and information query.

Therefore, in the teaching practice, in addition to the introduction of the basic knowledge and functions of GIS, the establishment and management of spatial database should be emphasized in the teaching of "GIS" course for urban planning specialty. In the study of thematic map making, students can have a preliminary understanding of the application of GIS through example teaching, and strengthen the cultivation of students' skills in data processing and digital city planning. It lays a solid foundation for students to use GIS for urban planning management and design.

The courses of "Urban Planning and Design" courses such as "Overall Planning" and "Detailed Planning" mainly use case teaching and practical teaching. The auxiliary teaching and

application teaching of GIS can run through the “master plan” and “detailed planning” of the city. “The various stages of the course teaching process. “In the case teaching of the “Urban Planning and Design” course, it is often necessary to cooperate with the planning drawings and graphic demonstrations to explain the planning principles and planning and design ideas. The display and visualization functions of GIS have changed the information expression in the past teachings, using paper drawings alone or lack of interactivity and dynamics of static electronic maps enhances the enthusiasm of students while improving information readability and comprehensibility. At the same time, the spatial database based on vector data can be arbitrarily scaled without affecting the characteristics of the visual effect and the management method of GIS in the spatial data and attribute data, so that the students can understand the overall system. Accurately express each local information, replacing the original simple and tough mechanical memory learning method to achieve better teaching results.

The practical teaching of the “Urban Planning and Design” course is usually a technical work procedure prepared according to the plan, allowing students to apply the urban planning theory to various planning techniques such as current situation research, planning analysis, and planning plan development, and familiar with the planning process. In the practice teaching process, the application teaching of GIS can be introduced consciously.

The analysis of the status quo is the basis for the preparation of the plan, which is also the most widely used aspect of the GIS in the planning. Since the GIS has the function of visualization, it can be used for the systematic storage of the basic data such as the quantity and scale of the same space object. The display and plotting of the series of thematic drawings can also be used to create the dem digital elevation model using the simulation function of GIS, and then generate a series of drawings related to the topography, such as elevation, slope and aspect. In the teaching of the status quo of the planning, the method and experience of collating relevant statistical data in planning and research can be introduced based on GIS, and the topography, landform, land use, administrative management, statistical data, and construction collected by various departments. And the related information such as ownership and other unified information to establish a spatial database, in the subsequent status analysis and planning land use design and multi-program comparison stage, can be combined with the GIS software on-board training, so that students learn to use GIS software analysis in the pre-planning program-assisted analysis to improve the scientific nature of the program.

In the planning of planning and site selection, for example, when it comes to industrial location selection and industrial layout, the spatial information processing capability of GIS can be fully utilized, and the planning area can be adopted by the method of “dividing geographic unit + factor weighting”. It is subdivided into several geographical units of equal size, and corresponding to a series of attribute data such as topography, traffic location, etc., guiding students to take different weight percentages affecting the industrial layout, forming a comprehensive indicator system, and performing factor weighting. Computing, seeking the best solution for industrial

layout, enables students to master not only the main theoretical knowledge of industrial site selection, but also the method of actual site selection. For example, in the planning of public facilities, using the spatial analysis function of GIS, focusing on the service facility, automatically generating a service area according to the service radius, obtaining the corresponding population size in the area, and then comparing the total population of the service area with the scale of the facility. According to the corresponding setting specifications, it is possible to find out the areas where new facilities need to be added, and provide reference for the location of the new facilities. Through the entire analysis process, students can more clearly grasp the relevant knowledge points.

V. CONCLUSION

Judging from the reform of teaching practice in recent years, the innovation practice teaching reform of GIS course has achieved initial results. The “three-in-one” teaching system of classroom teaching, innovation and entrepreneurship project training and practical teaching has gradually replaced the traditional teaching mode. With the penetration of computer and network technology around the world, the computer application foundation of students has also increased year by year. For the experimental teaching of GIS courses, software learning is no longer the threshold for students to understand GIS technology. The most important thing is to flexibly adjust teaching methods and teaching. The model, inspiring students' interest in self-learning, developing students' innovative consciousness and practical ability, no longer regards the GIS course as an independent computer or geography course, but gradually serves as a platform for the theory and innovation of urban planning professional courses. Fully mobilize the enthusiasm of students, improve students' ability to analyze problems and solve problems by using urban and rural planning new technologies, and deepen their understanding of urban planning disciplines.

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