Interdisciplinary Digital Humanities: Multidimensional Research on the Course Outline of "Introduction to Digital Humanities"

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Abstract. This study conducts a multi-dimensional analysis of the "Introduction to Digital Humanities" course syllabus and explores the development status and trends of digital humanities education on a global scale. The core of digital humanities education lies in the deep integration of technology and humanities, emphasizing the integration of interdisciplinary knowledge and the cultivation of practical abilities. The research results show that digital humanities education models and curriculum designs present diversified characteristics, reflecting the understanding and practice of digital humanities education in different universities. The development of digital humanities promotes the cross-integration of traditional humanities and modern scientific and technological disciplines, broadens students' knowledge horizons, and provides new perspectives and methods for solving complex social problems. Colleges and universities should provide flexible and diverse course options, strengthen cooperation with industry, establish exchange and cooperation platforms, and share teaching resources and experience. Through continuous exploration and practice, we will cultivate digital humanities talents with innovative abilities and interdisciplinary literacy, and contribute to the development of the humanities and the progress of society.

Keywords: Digital humanities, course syllabus, introduction to digital humanities.

1   Introduction

1.1   Background Introduction

Digital humanities originated from humanities computing in the 1940s. It is an interdisciplinary field of arts and sciences formed by applying computing tools and digital technologies to traditional humanities subjects such as literature, history, and philosophy. In recent years, with the rapid development of digital humanities, a number of digital humanities institutions have emerged, such as the Alliance of Digital Humanities Organizations (ADHO), the Society for Digital Humanities (The Society for Digital Humanities), and the Digital Humanities Center Network (CenterNet). Many foreign universities have also established their own digital humanities centers, dedicated

to providing support and guarantee for the research of digital humanities projects. At present, well-known foreign digital humanities research centers include the Digital Humanities Department of the School of Humanities and Arts at King's College London, the Humanities Center of Stanford University in the United States, and the Digital Humanities Research Center of the University of California, Los Angeles. Domestic digital humanities have also received widespread attention and research from scholars. In 2011, Wuhan University established the first digital humanities research center in mainland China, and is committed to freeing humanities scholars from simple and arduous data processing work and improving the efficiency of scientific research [1]; "Digital Humanities Research from the Perspective of Big Data" was selected as one of China's top ten academic hot spots in 2018, reflecting the academic theoretical community's continued attention to and vigorous research in the field of digital humanities [2]. At the same time, the number of various digital humanities conferences is also increasing year by year, from the "Digital Humanities Forum" international academic conference held regularly by Peking University in 2016 to the "Digital Humanities: Academic Frontiers and Academic Frontiers in the Big Data Era" hosted by Nanjing University in 2017. "Exploration" academic seminars, from the "Cultural Heritage Digitization and Digital Humanities Research" seminar at the First Dunhuang Digital Humanities Annual Conference (DH2019) to the "Accumulation and Transcendence: Digital Humanities and China" at the Second National Digital Humanities Annual Conference (DH2020) Culture", the launch of various academic conferences provides a broad platform for cooperation and exchanges between scholars in various fields at home and abroad, and is conducive to enhancing the academic influence of digital humanities and promoting the interdisciplinary development of digital humanities. Digital humanities are currently in the ascendant and are becoming a new research direction for scholars at home and abroad.

1.2   Research Problem

Course syllabus is a teaching document that guides teaching work, standardizes teaching behavior, and clarifies teaching responsibilities. It is the embodiment of the talent training plan in the teaching process. It is used to organize the teaching process, standardize teaching management, carry out course assessment, and evaluate teaching quality. Important reference. The foundation of educating people lies in teachers, the foundation of teachers lies in teaching, the foundation of teaching lies in curriculum, and the foundation of curriculum lies in syllabus. Whether at home or abroad, course syllabus is considered to be a programmatic guidance document or regulatory document in teaching activities [3]. As a new discipline, digital humanities is particularly in need of such guiding documents. It provides a clear roadmap and guidelines for developing the knowledge, skills and literacy students need. In teaching practice, course syllabus is the basis for teachers to design course content, formulate teaching plans, and carry out teaching activities. It provides a unified framework and standards for teaching and helps ensure the coherence, integrity and effectiveness of teaching.

As an emerging discipline, the interdisciplinary nature and complexity of digital humanities make course design particularly important. A comprehensive and clear

syllabus can help teachers integrate various subject knowledge and skills in this field and ensure that students can systematically master relevant concepts, methods and tools. Through the course syllabus, teachers can determine appropriate learning objectives and evaluation criteria to effectively assess student learning outcomes and further optimize the teaching process. In addition, digital humanities, as an interdisciplinary subject involving technology, humanities, social sciences and other fields, is developing rapidly and knowledge is updated rapidly. Therefore, a flexible and open course syllabus can keep the teaching content up to date, absorb the latest research results and technological advances in a timely manner, and ensure that students receive the most cutting-edge and practical knowledge.

2   Research Methods

2.1   Document Analysis

Retrieve relevant literature through CNKI, Web of Science, Emerald, Google Scholar and other databases, understand domestic and foreign research on digital humanities course syllabus, digital humanities education practice, etc., summarize and analyze the survey results, and conduct research on teaching in the field of digital humanities at home and abroad. Organize and summarize the outline.

2.2   Internet Investigation Law

Use search engines to access relevant school websites and digital humanities project portals one by one to find content on digital humanities syllabuses, use Internet access to track and analyze them, grasp the latest developments in real time, and conduct research on representative digital humanities education practice cases. Introduction and analysis.

2.3   Comparative Research Method

A comparative research method was adopted for different schools with the same course, and the characteristics of their digital humanities teaching syllabus design were summarized through the data of the survey subjects in terms of teaching objectives, teaching methods, assessment methods, etc., and then the teaching syllabus for digital humanities majors in colleges and universities in my country was formulated. It serves as a reference guide at both theoretical and practical levels.

2.4   Case Analysis

This paper selects the introductory digital humanities syllabus of five schools: Harvard University, Rice University, City University of New York, Shanghai University of Science and Technology, and Uppsala University as cases to conduct horizontal and vertical comparative analysis to explore the digital humanities teaching practices of

domestic and foreign universities. similarities and differences, and the possible reasons behind them.

3   Digital Humanities Course Outline Multidimensional Research

Based on QS rankings, the development of digital humanities centers, and the construction of digital humanities, this article also refers to the course openings. A total of five universities' "Introduction to Digital Humanities" course syllabus are selected for analysis. Rice University, Harvard University, City University of New York, Shanghai Science and Technology The university and Uppsala University each have their own strengths and have formed their own distinctive curriculum.

3.1   Subject Content and Scope

As many people know, Introduction to Digital Humanities is an interdisciplinary research field that involves the combination of information science and humanities research, as well as a major self-revolution in the context of the rapid development of big data, cloud computing, and artificial intelligence. This discipline brings new research paradigms, methods and paths to humanities research, and builds a new bridge of interaction, complementation and integration between humanities and science. In 2009, the Digital Humanities Manifesto (Digital Humanities Manifesto) released by the United States emphasized that digital humanities is not a unified field, but a collection of multiple practices that explore a world where printed matter is no longer the sole vehicle for knowledge production and dissemination. Or the world of regulated media. Digital tools, technologies and media have transformed the way knowledge is produced and disseminated in the arts, humanities and social sciences. In addition, Feng Huiling pointed out that digital humanities education has obvious "three no's" characteristics, one of which is that there is no consensus on subject knowledge categories and curriculum systems. Due to the breadth of the field of digital humanities, most digital humanities education in universities in various countries has its own entry points and different appearances under the three categories of humanistic knowledge, digital technology methods and project practice [4].

Taking Rice University as an example, it focuses on text analysis, spatial humanities, information visualization and digital publishing models, emphasizing the processing of large amounts of text data and applying it to the research of sound, images and videos. His positivism and research methodology are highly influential both at home and abroad. In comparison, Harvard University's digital humanities course covers more fields, including the concept and definition of digital humanities, data management and organization, text analysis technology and the application of text visualization tools, etc. It is a typical representative that pays equal attention to theory and practice. The City University of New York chose to introduce digital humanities at the beginning of the two-year course to provide an opportunity for a more macro perspective and comprehensive understanding, and to achieve a broad understanding of

the field. At the same time, ShanghaiTech University seeks to provide comprehensive theoretical knowledge while strengthening practical training to cultivate the language expression skills and innovative thinking skills necessary for research talents in the new era. Compared with Rice University and Harvard University, which focus on theoretical research and research methods, and City University of New York and Shanghai University of Science and Technology, which emphasize macro understanding and practical capabilities, Uppsala University in Sweden focuses more on the study and development of the history of digital humanities. Practical applications of digital tools.

In summary, the curriculum of each university strives to be comprehensive and in-depth, but each has its own focus due to the school's teaching philosophy and resources, forming a pattern of complementary advantages.

3.2   Teaching Objectives

In school education, the goal is a system with a hierarchical structure. It can be divided into three levels according to the order from macro, abstract to micro and concrete: The first level is the training goal of the school, which is relatively abstract in level and macro in statement. Goals are the overall goals that school education strives to achieve and are also the basis for arranging schools to offer various types of courses and course areas; the goals at the second level are slightly more specific. Curriculum goals are the goals to be achieved by a certain course, taking into account different learning areas and students. The development status breaks down the broad training goals into more specific ones in the form of behavioral goals as curriculum standards; the goal of the third level is to analyze the curriculum goals to an operational level, describe the specific behavioral results, and guide the development of teaching, so it is called teaching. Goals (i.e. classroom teaching goals or learning goals) describe a unit or a lesson that teachers need to determine the specific goals to be accomplished during classroom teaching and are the most specific and operable unit in the goal system [5]. The teaching goals of digital humanities include allowing students to understand the importance of digital humanities to academic research and society, and how it promotes the development of traditional humanities [6], teaching students how to use and master corresponding tools and technologies, allowing students to develop computational thinking, and learn how to use computational methods to analyze and explain problems in the humanities [7], while being able to critically analyze these theories and methods and promote interdisciplinary innovation and discovery.

The "Introduction to Digital Humanities" courses in the five universities all emphasize the active integration of digital technology and humanities so that the two complement each other. The school's teaching goals focus on educating students how to use digital tools such as big data, text encoding and data visualization, while conducting in-depth and impactful research in different humanities disciplines. In this process, students can not only penetrate and change academic research paradigms, but also deepen their understanding of humanities knowledge. Harvard University and City University of New York focus on training students to effectively use big data and data visualization techniques to conduct in-depth and impactful research. Rice University and ShanghaiTech University focus more on stimulating students' innovative con-

sciousness and using digital technology to create new interpretations and methods. Uppsala University emphasizes the cultivation of a global perspective. They actively promote comparative research to enable students to understand the concepts of different cultures, religions and histories.

3.3   Technical Tools and Methods

Among the five schools, Harvard University has equipped its courses with three major modules: programming language structure, data analysis and data visualization. In course design, Harvard University encourages students to use one or more programming languages, such as Python, R, or JavaScript, and then conduct relevant statistical analysis and data mining. In this process, data collection, data processing and data analysis can be combined, and finally presented through data visualization to perform spatial data analysis and interpretation. In this process, Harvard University also joined the teaching and training of Geographic Information Systems (GIS). Rice University's courses focus on the combination of text analysis and GIS technology. In specific teaching, Rice University attaches great importance to the use of Python for text mining and statistical text analysis. Through GIS technology, students can gain a new understanding of historical geographical phenomena from the analysis and visualization of geospatial data. The curriculum of the City University of New York is relatively comprehensive, and it mainly provides students with a complete set of data science skills training from data collection to data cleaning, and finally to data statistics and visualization. In this system, the use of new data tools such as R statistics and Tableau can make large-scale text processing and data mining operations easier. At the same time, New York supports Hadoop, a distributed storage and processing framework in a big data environment, and Tableau, a data visualization tool. The curriculum design of ShanghaiTech University focuses on data mining and machine learning technology. You need to master Python or R language to obtain, process and analyze information. However, at the same time, the course also covers the basic training and use of machine learning and deep learning, and will also expose and master modern big data processing platforms such as Hadoop and Spark. Uppsala University's digital humanities department extensively uses SQL language, machine learning and artificial intelligence technology. Knowledge and abilities in database management, machine learning model design, and deep learning technology will be cultivated in a planned way in the course.

In general, digital humanities aims to adopt and develop various advanced digital technologies to explore and interpret issues in humanities research more deeply and comprehensively. Although each discipline and school may have its own focus and style, they all recognize the importance and value of digital technologies in humanities research, especially in processing and analyzing large-scale data and solving the challenges faced by traditional humanities research. hour. This also highlights the dual nature of digital humanities, which is both a technical means and a research method.

3.4   Teaching Method

According to the syllabus, all five universities have particularly emphasized the proportion of practice - whether it is hands-on practice at Harvard, project collaboration at Rice, laboratory work at the City of New York, or interactive lectures at ShanghaiTech University and case analysis in Uppsala ——They all encourage students to participate in practical operations and gain practical experience. This fully reflects the characteristics of digital humanities as an interdisciplinary field that emphasizes the combination of theory and practice.

However, these schools have their own characteristics in the way they implement practical teaching. For example, the project-centered teaching methods encouraged by Uppsala and Rice universities focus on cultivating students' ability to collaborate in groups and exercise their overall thinking and practical skills by solving practical problems. On the other hand, Harvard and CUNY tend to emphasize more on lectures and laboratory research, promoting students to engage in topic learning and problem solving from the perspective of researchers, and focusing on improving their independent thinking abilities. In terms of classroom organization, in addition to traditional face-to-face lectures, CUNY and ShanghaiTech University have chosen hybrid and online teaching methods to fully meet students' needs and convenience. This also enhances students' independent learning abilities.

Each of these teaching methods has advantages and disadvantages. The project cooperative teaching method can improve students' teamwork ability, and the case analysis or laboratory work that incorporates education into practice is more conducive to the digestion and understanding of theoretical knowledge and can also enhance students' operational skills. However, they may also result in theoretical teaching being neglected, or the complexity of project management becoming a hindrance and requiring appropriate teacher guidance and support.

3.5   Assessment Method

Harvard University, Rice University and Uppsala University all attach importance to the evaluation of projects and practical works. Harvard University considers students' project work as the final product. In addition to evaluating individual project progress, Rice University also evaluates team work. Uppsala University requires students to submit a reflective report on the entire project process at the end of the course. These forms of assessment methods can avoid the problem of "exam-taking" and can test students' actual operation level. At CUNY and ShanghaiTech University, class participation and discussion are used as important assessment methods. Both schools emphasize student interaction and participation. The City University of New York will evaluate students based on their discussions and participation in class, while ShanghaiTech University will evaluate students' understanding and reflection on course content through online discussion sections.

In addition, these universities also use more traditional assessment methods such as midterm and final exams or essays. Harvard University includes the writing of midterm and final research papers in the curriculum, and Rice University requires students to

submit a final research plan. Both City University of New York and Uppsala University have final exams. It is worth noting that these schools also pay attention to student feedback while conducting academic assessment. For example, ShanghaiTech University collects students' suggestions and feedback on teaching through questionnaires, and Uppsala University regularly conducts student evaluations to obtain student feedback on course content and teaching methods in a quantitative way.

Taken together, when setting up assessment methods, these universities not only focus on the cultivation of practical skills, but also retain a certain amount of theoretical assessment. This assessment method not only ensures that students master the necessary technical skills, but also tests their understanding of theoretical knowledge in the digital humanities. At the same time, they also understand the importance of student feedback in course teaching, allowing students to participate in the improvement and improvement of the course.

3.6   Resources and Support

A total of three universities among the five schools include corresponding laboratories: Harvard's Open Digital Humanities Laboratory, the Digital Academic Service Center of the City University of New York, and the Digital Humanities Laboratory of Shanghai University of Science and Technology. They provide comprehensive support from hardware and software resources to professional teams. The school's internal resources are quite rich and emphasize practical operations, giving students the opportunity to access and use a range of facilities from basic data management tools to advanced 3D printing equipment. This plays an important role in improving their practical skills as well as understanding and applying theoretical knowledge. In the case of Rice University and Uppsala University, they both have a comprehensive set of online tutorials and workshops to help students acquire the required skills and knowledge. These online resources and workshops also help improve students' self-learning and problem-solving skills.

Although the schools are different in some aspects, for example, Rice University and City University of New York both emphasize providing internships and practical opportunities, while ShanghaiTech University attaches great importance to inviting experts in the field of digital humanities to give lectures to provide more academic exchange opportunities. But in general, they all emphasize practice, communication and self-learning, and aim to create a learning environment that can help students improve their skills, expand their knowledge horizons, and cultivate independent thinking and problem-solving abilities through the provision of resources and support services.

Finally, in addition to the support of the hardware devices and software tools mentioned above, digital humanities teaching also needs to include access to open data sources, tools for digital organization and management, efficient collaboration platforms, and information on how to effectively utilize these resources. training.

4 Conclusion

4.1 Discuss Research Results

This study reveals the development status and trends of digital humanities education on a global scale through a multi-dimensional analysis of the "Introduction to Digital Humanities" course syllabus. The educational model and curriculum design of digital humanities show diversified characteristics, reflecting the understanding and practice of digital humanities education in different universities. Research results show that digital humanities education not only focuses on the teaching of technical tools, but also emphasizes the integration of interdisciplinary knowledge and the cultivation of practical abilities.

First of all, the core of digital humanities education lies in the deep integration of technology and humanities. This is reflected in the course syllabus of various universities, whether it is text analysis, spatial humanities, information visualization or digital publishing models, all emphasizing the application of digital technology in humanities research. The introduction of digital tools and technologies has not only changed research methods, but also brought new research objects and fields to the humanities.

Secondly, interdisciplinary integration is another major feature of digital humanities education. The development of digital humanities has promoted the cross-integration of traditional humanities disciplines such as literature, history, philosophy, art, and social sciences with modern scientific and technological disciplines such as information technology and data science. This interdisciplinary integration not only broadens students' knowledge horizons, but also provides new perspectives and methods for solving complex social problems.

Finally, the cultivation of practical abilities is an important goal of digital humanities education. Through teaching methods such as project collaboration, laboratory work, interactive lectures and case studies, students are able to apply theoretical knowledge to solve practical problems. This practical teaching model not only improves students' practical abilities, but also exercises their teamwork and innovative thinking abilities.

4.2 Make Suggestions for Practice

First, colleges and universities should provide more flexible and diverse course options based on students' individual needs. Digital humanities education should encourage students to choose courses and learning paths that suit them based on their interests and future career development directions. This can not only improve students' learning enthusiasm and initiative, but also cultivate their ability to learn independently and lifelong learning.

Secondly, colleges and universities should strengthen cooperation with industry and provide students with more internship and practical opportunities. Through cooperation with digital humanities-related companies and institutions, students can apply the knowledge they have learned in real work environments and understand industry needs and development trends. This kind of cooperation can not only improve students'

practical abilities, but also promote the connection between college education and social needs.

In addition, it is recommended that universities establish more communication and cooperation platforms to share teaching resources and experience. Through academic conferences, seminars, and online courses, teachers and students from different universities can learn and communicate with each other and jointly promote the development of digital humanities education. This kind of exchange and cooperation can not only promote the optimal allocation of educational resources, but also improve the quality and efficiency of education.

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