

Research on Interdisciplinary Education in Digital Economy

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Abstract. The digital economy requires human resources with the skill set covers multiple disciplines. At present, the development of interdisciplinary education in universities is still in the phase of experiment. This paper analyzed the issue of curriculum reform, teaching method reform and innovation, contexture aware education, and evaluation system in interdisciplinary education. The curriculum should be integrating courses from different disciplines, containing more practice class hours and emphasize interaction between different courses. The teaching method should be more inclined to critical thinking and higher level thinking, so as to achieve problem solving abilities. Innovative approach should be adopted in interdisciplinary education to enhance the quality of education. Context aware education requires acceleration of knowledge update, adaption to labor market, and entrepreneurship education. The evaluation standard should be designed and implemented for interdisciplinary education, so as to balance theoretical studies and practical knowledge application, to ensure the efficiency of the learning outcome.

Introduction

In digital economy, increasing internet use in almost all aspects of social and economic environment requires human resources with the skill set of information technology, finance and commerce. Interdisciplinary education in universities has been experimenting to meet the requirement of the social and economic condition. This paper analyzed the curriculum plan, teaching method, innovation and evaluation of interdisciplinary education in university, as well as the relation between university education and labor market. The paper is organized as follows: the second section discussed curriculum reform in interdisciplinary education; the third section analyzed pedagogy reform and innovative approach; the fourth section elaborated contexture aware education and entrepreneurship education; the fifth section discussed the evaluation standards for interdisciplinary education; the final section concludes.

Curriculum Reform

In fast developing digital economy, the labor market demand requires human resources with interdisciplinary professional knowledge from various fields, such as computer science, financial and investment, business and commerce. The ever changing economic environment and labor market requires interdisciplinary education in universities. With nearly a decade of the experience of interdisciplinary course in Hangzhou Institute of Service Engineering, Hangzhou Normal University, the curriculum plan has been reformed and improved during undergraduate student education and interaction with the industry. In the curriculum plan, the uniqueness of interdisciplinary education requires the integration of courses from different fields, the interaction between courses and practice courses. The curriculum could not be just a simple add up of separate courses. Firstly, the curriculum included core courses from computer science, financial and investment, business and commerce courses, so as to build a solid knowledge basis and prepare student for further studies. All core courses included sufficient practice class hours. The courses are organized by professors and lecturers with both academic and industry background, with professional knowledge and industry experience in finance and information technology. Financial courses are organized differently from finance

major students in department of economics. Apart from financial knowledge in line with typical undergraduate financial courses, information technology and application of financial knowledge in digital economy are combined with traditional teaching. Then, workshops, seminars and other forms of training combining knowledge application from information technology and financial services are introduced to enhance knowledge application abilities and cultivate innovation. Individual practice courses and practice class hours in theoretical courses help students to use professional knowledge to solve practical problems, prepare students in future academic research or career in digital economy. The practical courses equipped students with information technology under different infrastructure, as well as analysis abilities in banking, investment and insurance industry. Furthermore, Group studies and projects covering different areas of learning are applied in lectures, practice courses and other forms of learning. Traditional courses could not achieve goals of interdisciplinary education alone. The traditional teaching methods, including practice courses, are separated from other courses, which could not integrate all abilities required. Creative credit earning system is introduced in curriculum reform. Practice training projects are equivalent to academic credit points to provide students with capabilities in future career. Group studies and other research based learning are credit point earning process to more academic research oriented students. Undergraduate students in junior and senior years are streamed into different fields, such as financial service, financial engineering, and financial data analysis. Students are also streamed into different groups, research centers and laboratories in junior year. Except for compulsory and optional courses, year three and year four students are required to accomplish projects and researches under the supervision of their tutors. Moreover, the graduate thesis also requires knowledge from computer sciences, financial and investment, business management and commerce, which would include information system and financial data analysis. The evaluation of the degree completion thesis includes standards for both financial and information technology knowledge. To conclude, in interdisciplinary education combining computer science and finance, the curriculum reform emphasizes on integration of courses, enhanced practice courses, and intensive training in projects and research.

Pedagogy Reform and Innovative Approaching

Pedagogy Reform

Pedagogy reform in universities emphasizes innovation and application of knowledge. How to achieve the balance between theoretical knowledge basis and practice of the knowledge should be considered in interdisciplinary education. The university education has intrinsic academic oriented, which could not be teaching only skills for present labor market like trade schools. However, the obsolete knowledge teaching could neither satisfy the development of society and economy, nor knowledge update. For example, as for financial courses, from knowledge perspective, the students are required to understand basic concepts, mathematical models, and mechanism of financial market, financial instrument and financial institutions; from application perspective, students are required to use aforesaid knowledge to solve practical financial problems, based on financial data and proper methodology. Individuality of students should be considered as an important factor in teaching planning and lecture design. More creative and comprehensive tasks should be assigned to top of the class, while more support should be provided students with difficulties understanding the basics. For example, in the course of financial engineering, the students are grouped into different teams in practice class hours, to accomplish different projects. The most capable students are provided opportunities to develop financial product, the project include from product design, pricing and risk management. The medium level students would accomplish assignment in typical experiment course project in financial engineering course. The students with some difficulties would participate in experiments design specifically to help understand theoretical studies in the course. Relatively large class size in lectures in universities leads to easier teaching materials in course assessment, and lower standards. As a result of exam oriented education, some of the university students are lack of motivation for further studies. Professional awareness education should be provided at the beginning of freshman year so as to prepare students for university studies, and establish goals of professional

learning. The class size should be reduced in universities, to guarantee quality of course teaching, to ensure sufficient interaction between students and teachers, to improve study experience of individual students. The teaching model of prestigious overseas universities could be adopted by universities in China. The literature reading material should be increased to supplement text books and teaching in class. Same amount of time as lectures should be assigned to seminars, workshops or instruction hours. The efficiency of tutoring system in undergraduate education should be enhanced.

Innovative Approaching

Universities are primary source of innovation. Innovation could be cultivated in universities, not only by academic research by professors, but also by innovative education for all students. Innovative approach in university education provide students with methodology and capability to knowledge update, and equip students for the ability for obtaining skills required in the future, other than merely professional knowledge in traditional context. Scientific research project for undergraduate students has been introduced in universities in the last decade. Innovation has also become an important evaluation element in thesis, which is compulsory for degree completion. However, existing innovation education, such as scientific projects for outstanding students and thesis in final year is not enough. More innovative approach should be started from freshman year, and integrated in most courses in lectures. Critical thinking could be required in all courses of study. Higher level thinking is the difference from universities to trade schools. The concept of deep learning could be introduced in class hours in universities. Critical thinking integrated in all courses could also enhance the quality of science project and final thesis. At present, the resources in libraries and databases of universities are infrequently used by undergraduate students, whose attention has been focused on text book and examinations. In the course of financial engineering, students are instructed to design new financial planning project with basic instrument and derivative financial instrument. Group discussions are conducted in the course of international finance; students are required to discuss frontier issues in international finance with theoretical knowledge and latest information. For example, the “Brexit” issue would be discussed with foreign exchange determination theories and international trade theories, the quantitative easing policy is discussed with interest rate parity theories.

Contexture Aware Education

Entrepreneurship Education

Entrepreneurship education is an important element in university education in recent economic environment. Entrepreneurship, digital economy, international commerce and information technology has been integrated into degree courses in departments in Hangzhou Normal University, such as Hangzhou Institute of service engineering and Alibaba Business School. Knowledge application has been emphasized in afore said institutes, half of the courses has practice class hours, and various form of group studies and entrepreneurship opportunities are provided for all students. Financial, legal and technical support has been provides for students who are experimenting in starting a business. Business management advisory and consultation are provided by staff in university and tutors from industry. Flexible credit earning system accredited entrepreneurship education as credit earning course, which increases student participation rate. Entrepreneurship education would improve the communication abilities, independent working abilities, risk management abilities and technology absorption abilities of students, and cultivate pioneering spirits and creative initiative.

Future Career and Interdisciplinary Education

University education should be adaptable to changing economic environment and the labor market. In digital economy, new technology, new methods to conduct business, new instruments in financial market and new commerce models has been emerging rapidly. Contexture aware education should be catching the changing in a timely manner, and integrate the change into university education. With increasing users of internet technology and the development of internet finance, the number of

information technology corporations and their employees are increasing sharply. At present, human resource demand in information technology and internet finance is surging, while traditional higher education could not meet the demand. Cooperation with corporations in the industry could help university educations to design the teaching plan more up to date, and better prepare their students for potential employers. Mostly used programming language should be compulsory course in interdisciplinary education. Course design should also be integrated with frontier knowledge in financial market. The latest financial products, financial institutions and stipulations should be included in university education. The text books and teaching plans which has becoming obsolete should be replaced by more up to date teaching materials. The role of information technology education and financial education should be enhanced in universities. Simulating laboratories are provided to students in and outside classes, to provide trading similar to working environment, and better prepare students for future career in the labor market.

Evaluation Standards for Interdisciplinary Education

Interdisciplinary education is most likely in experiment phase in universities. No consensus has been reached in how to evaluate the outcome of interdisciplinary education or the academic performance of each student. A standardized evaluation system should be established so as to ensure the quality of interdisciplinary education and provide a guideline for educators in different institutions. The standard is more difficult to establish for the uniqueness of interdisciplinary education. The requirement of interdisciplinary degree course with business, finance and computer science studies could not simply be added up by requirements of separate disciplines. How to build an assessment system to evaluate the professional knowledge understanding and application, the innovative abilities, the capability of problem solving in the field of finance and information technology, the interaction between courses, would be an important issue and cooperative tasks for universities. The assessment would be detailed and embedded in the course. Evaluation could be divided in several phases, at the end of each phase the students should pass the exam or other form of evaluation to enter next phase. Mathematic skills, programming skills and knowledge in finance and commerce would be tested in beginning phases. More comprehensive problem solving and innovation capabilities would be tested in advanced phases. Bologna Process, international experience in ensuring the quality of higher education, conformity in standards in degree courses. Digital economy and internationalization requires universal standards in interdisciplinary education in all higher education institutions across the countries, the regions or even across the world. A universal standard of interdisciplinary education could be discussed by university group, and decided after experiment in various universities. The standard should specify curriculum structure, course requirements, technology requirement, and theoretical knowledge requirement and quantified capability requirements.

Conclusions

The digital economy requires human resources with the skill set covers multiple disciplines, including information technology, finance and investment, business and commerce. At present, the development of interdisciplinary education in universities is still in the phase of experiment, a universal standard for curriculum design, evaluation system and teaching method should be reached by the effort of various higher education institutions. This paper analyzed the issue of curriculum reform, teaching method and innovation, context aware education and evaluation system in interdisciplinary education. The curriculum should be integrating courses from different disciplines, containing more practice class hours, emphasize relation between different courses. The teaching method should be more inclined to critical thinking, encourage students to higher level thinking and research, so as to achieve problem solving abilities. Innovative approach should be adopted in courses, lectures, workshops, seminars, projects and thesis, so as to enhance the quality of interdisciplinary education in universities. Context aware education should be adaptable to changing economic environment and labor market, which requires acceleration of knowledge update, adaption to labor

market, communication skills and entrepreneurship education. The evaluation standard should be designed and implemented for interdisciplinary education, so as to balance theoretical studies and practical knowledge application, to ensure the efficiency of the learning outcome.

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