Research on Swift Certification Construction of Application-oriented University Based on Emerging Engineering Construction

Pan Jiang[1,a],Tong Zhang[2,b],Xiaoqian Yang[1,c*],Aoyue Xu[1,d]

[a] e-mail:44257597@qq.com, [b] e-mail:1217188635@qq.com
*[c] Corresponding Author:2672522812@qq.com, [d] e-mail:1815124793@qq.com

[1] School of Information Engineering, Wuhan Business University, Wuhan, China
[2]School of Computer Science and Artificial Intelligence, Wuhan Textile University, Wuhan , China

Abstract. With the requirements of emerging engineering construction, more and more application-oriented undergraduate colleges join the team of emerging engineering construction. The purpose of this project is to carry out research on the construction of Swift certification in application-oriented undergraduate colleges based on the construction of emerging engineering, so as to improve students' academic level and technical ability. This paper first puts forward the Swift certification scheme for application-oriented undergraduate colleges based on emerging engineering construction, then lists the results achieved after the implementation of the scheme in detail, and finally makes a summary. Through the research of this subject, the Swift certification scheme for application-oriented undergraduate colleges based on emerging engineering construction is reasonable and effective, with rich achievements. Students have made obvious progress and improvement in academic level and technical ability, and the purpose of this project has been realized.

Keywords: Emerging Engineering, Application-oriented University, Swift Certification, Construction, Research.

1   Introduction

With the development of higher education, the cultivation of applied talents has become more and more urgent. With the construction of Emerging Engineering, more and more application-oriented undergraduate universities join the construction team. Compared with other programming languages, Swift adopts a secure programming mode and adds many modern functions to make programming easier, flexible and interesting, so it has a wide range of application prospects[1].Therefore, under the background of Emerging Engineering construction, it is more and more necessary to research Swift certification for application-oriented undergraduate students.

2   Terminology

2.1   Emerging Engineering

In February 2017, the Ministry of Education reached the "Fudan Consensus" on the construction of "Emerging Engineering" at Fudan University[2], indicating that the reform of engineering education in China is a collective action with many expectations. In April 2017, the Ministry of Education defined the action line of "Emerging Engineering" construction in Tianjin University, namely "Tianda Action"[3], which officially opened the curtain of nationwide engineering education reform in the new stage. At present, "Emerging Engineering" has become the most striking keyword in the reform discourse. The Emerging Engineering Construction takes the cultivation of compound talents as the fundamental goal, and the "cross integration" of multiple disciplines has become the important feature of the Emerging Engineering Construction.[4]

2.2   Application-oriented University

In February 2014, the executive meeting of The State Council planned to accelerate modern vocational education, and Premier Keqiang Li clearly proposed to "guide a number of ordinary undergraduate colleges and universities to transform into technology-oriented colleges and universities". Subsequently, the Ministry of Education and various local competent education departments have vigorously promoted the transformation and development of local undergraduate universities. The Education Department of Hubei Province has also formulated the Opinions on Carrying out the Pilot Work of Transformation and Development of Provincial undergraduate colleges and Universities, and deployed provincial pilot projects of transformation and development of provincial undergraduate colleges and universities into technology-oriented colleges and universities.

Application-oriented Universities are the product of meeting the market demands and meeting the needs of higher education popularization. With the requirements of education authorities in the country and Hubei Province, the transformation of local undergraduate colleges into application technology colleges becomes a new trend. Application-oriented undergraduate education is an important part of higher education. The logical starting point of application-oriented undergraduate education is discipline and professional standards, which generally combine theory with practice[5]. Therefore, application-oriented undergraduate personnel training is an important part of higher education personnel training, which can implement the strategic deployment of taking the new road of industrialization with Chinese characteristics, building an innovative country, building a powerful country with human resources and the Outline of the National Medium- and Long-term Education Reform and Development Plan.

2.3   Swift

In June 2014, Apple in its worldwide developers conference, launched a new - Swift development language.[6] Swift is a powerful and intuitive programming language for iOS, iPadOS, macOS, tvOS, and watchOS. Swift's syntax is clean, but it's expressive, and it includes modern features that developers love[7]. Swift code is designed to be secure and make software that runs as fast as lightning.

iOS Student Club is a new student organization that emerged during the cooperation between Apple Inc. and universities in recent years, aiming to promote the cultivation of mobile inno-

vative talents in the direction of iOS for students in universities and colleges.[8]Students learn Swift language in the iOS student club.

3 System Construction

Students are willing to sign up and join professional clubs. Students learn Swift language in the club, and teachers teach students Swift language. After a period of study, the student receives the Swift certificate. Students use Swift language to develop apps of iOS system, use the developed APP products to actively participate in the Mobile application Innovation Competition of China University Computer Competition, use the developed APP products to apply for the software copyright of the People's Republic of China, and write academic papers combined with the APP products and publish them in academic journals. Students will also participate in iOS activities such as the winter camp of iOS Club and the summer camp of iOS Club. All these measures are focused on cultivating students' application-oriented talents, so as to meet the purpose of the construction of Emerging Engineering.

The implementation path of the project "Research on the Construction of Swift Certification for Application-oriented Undergraduates Based on the Construction of Emerging Engineering" is shown in Fig.1.
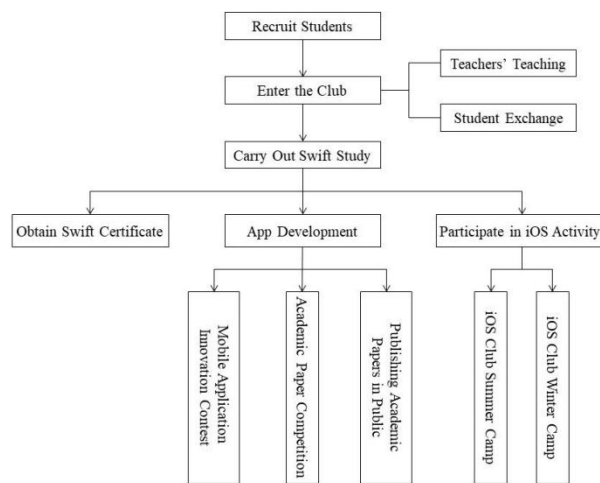

Fig. 1. Project Construction Implementation Path Chart

4 Achievements

4.1 Pilot Class of Talent Training Reform of Wuhan Business University

Pilot class of talent training reform of Wuhan Business University is a teaching reform project funded by Wuhan Business University, which revolves around the characteristic undergraduate strategy, takes the benefit of students and the cultivation of characteristic talents as the starting

point, and takes the cultivation of students' social responsibility, learning ability, practical ability, innovation ability and entrepreneurial ability as the goal, and comprehensively deepens the reform of education and teaching. According to the different professional positioning and discipline background, we should construct the classified and hierarchical talent training mode, form the effective characteristic talent training environment and training mechanism, build a number of distinctive innovative talent training bases, and improve the professional construction level and talent training quality.

In 2019, "iOS Mobile Internet Practice Pilot Class" was approved as the pilot class of talent training reform of Wuhan Business University. The construction period is 3 years, and the funding support is ¥30,000 per year, with a total of ¥90,000."iOS Mobile Internet Practice Pilot Class" Talent training reform pilot class aims to learn by relying on Apple's resources and curriculum system. The pilot class' students participated in the front-line practice of Apple enterprise development, and eventually they could skillfully develop iOS apps. The experimental class cultivates college students' innovation and entrepreneurship training ability based on students' iOS products, participates in activities such as iOS summer camp or winter camp carried out by Apple, and finally cultivates applied talents with emerging engineering characteristics, innovative consciousness and ability, and international vision of mobile Internet technology under various forms of cultivation.

4.2 Obtaining the Swift Certificate

A lecture on Swift is given to new members of the club every year. Students are actively encouraged to learn Swift language in MOOC[9] of Chinese universities, and students are organized to take part in Swift certificate assessment. In 2020, 4 students obtained Swift Introduction to Innovation certification, as shown in Table1.

Table 1. Chinese University MOOC Certification Certificate Information Table

Serial Number	Name	Certificate Number
1	Xiaoqian Yang	V216942000001
2	Chunyue Jiang	V216942000002
3	Binbin Li	V216942000003
4	Yuzhuo Liu	V216942000004

4.3 Developing APP Software

The main purpose for students to learn Swift language is to develop APP software. From 2019 to 2021, students used Swift language to develop APP software and obtained software copyright registration certificate of the People's Republic of China for 3 items. The information obtained is shown in Table 2.

Table 2. Statistical Table of Software Copyright

Dynacomm	Certificate Number	Date
"Learning Bear" APP V1.0	No. 4069949	June 24, 2019
Product Accurate Push APPV1.0	No. 7421733	May 17, 2021

College Student Behavior Recognition Psychological Test Wechat Mini Program V1.0	No. 7848638	July 30, 2021

4.4 Participating in the Mobile Application Innovation Contest

The 2022 China Collegiate Computing Contest is sponsored by the Computer Education Research Association of Chinese Universities. The Mobile Application Innovation Contest was jointly organized by Zhejiang University and Apple Inc[10]. At present, the China Collegiate Computing Contest-Mobile Application Innovation Contest has been successfully held seven times. In June 2019, the team composed of Yanyin Mei, Chenmeng Gu and Gang Xu advanced to the 2019 China Collegiate Computing Contest-Mobile Application Innovation Contest.

4.5 Participating in the Academic Paper Competition

Academic paper competition can cultivate students' creative ability and academic accomplishment. Student write papers based on the APP products, and participate in academic paper competitions for university students. In June 2019, a total of 5 students won 5 awards in the academic paper competition of Wuhan Business University, including 1 second prize, 3 third prizes and 1 excellence award. In June 2021, a total of 5 students won 4 awards in the academic paper competition of Wuhan Business University, including 1 first prize, 2 second prizes and 1 excellence award. As shown in Table 3.

Table 3. Statistical Table of Academic Paper Competition

Name	Title	Awards	Date
Tong Zhang	Design and Implementation of Safety Ranging Alarm System Based on wsn	The second prize	June,2019
Yuxin Luo	Design and Implementation of Commodity Accurate Push System Based on Big Data Technology	The third prize	June,2019
Jing Xiong	Design and Implementation of Controllable Learning APP Based on Face Recognition Pattern	The third prize	June,2019
Danhong Ding	Design and Implementation of Controllable Learning Database System Based on Face Recognition Pattern	The third prize	June,2019
Huiling Xu	Design and Implementation of Controllable Learning APP Based on iOS System	excellence award	June,2019
Tong Zhang	Design and Implementation of Wechat Mini Program for College Students Psychological Test Based on Behavioral Feature Recognition	The first prize	June,2021
Tong Zhang,Shuhan Hu	Design and Implementation of College Student Psychological Test System Database Based on Behavior Characteristic Recognition	The second prize	June,2021
Xiaoqian Yang	Design and Implementation of Mobile Terminal Control APP for Teenagers Based on Big Data Technology	The second prize	June,2021
Shuang Yang	Design and Implementation of Shared Parking Space APP Based on 5G Technology and Internet of Things Technology	excellence award	June,2021

4.6 Publishing Academic Papers in Public

The purpose of publishing academic papers is to cultivate students' creative ability and academic accomplishment. From 2019 to 2021, eight papers by eight students were published publicly, as shown in Table 4.

Table 4. Statistical Table of Published Academic Papers

Serial Number	Title	Published Time
1	Design and Implementation of Safety Ranging Alarm System Based on WSN	July,2019
2	Design and Implementation of Controllable Learning APP Based on iOS System	August,2019
3	Design and Implementation of Controllable Learning APP Based on Face Recognition Pattern	September,2019
4	Design and Implementation of Controllable Learning Database System Based on Face Recognition Pattern	October,2019
5	Design and Implementation of Virtual University Town APP Based on iOS	November,2019
6	Design and Implementation of Commodity Accurate Push System Based on Big Data Technology	December,2019
7	Design and Implementation of Wechat Mini Program for College Students Psychological Test Based on Behavioral Feature Recognition	August,2021
8	Design and Implementation of Mobile Terminal Control APP for Teenagers Based on Big Data Technology	December,2021

4.7 Participating in iOS Activities

The purpose of participating in iOS activities is to broaden students' horizons and make more friends ,such as iOS summer camp and winter camp. From 2019 to 2021, a total of 14 students participated in activities such as iOS summer camp or winter camp , obtained certificates of completion, as shown in Table 5.

Table 5. Activity Statistics Table

Name	Project	Date	Place
Xin Chen	iOS Club Winter Camp	January,2019	Shanghai Business School
Danhong Ding	iOS Club Winter Camp	January,2019	Shanghai Business School
Yanyin Mei	iOS Club Winter Camp	January,2019	Shanghai Business School
Huiling Xu	iOS Club Winter Camp	January,2019	Shanghai Business School
ZhiWen Zheng	iOS Club Winter Camp	January,2019	Shanghai Business School
Jingzhan Lei	iOS Club Summer Camp	August,2019	Xiamen University
Shuang Yang	iOS Club Summer Camp	August,2019	Xiamen University
Xuanxuan Fan	iOS Club Summer Camp	August,2019	Xiamen University
Chunyue Jiang	iOS Club Summer Camp	August,2019	Xiamen University

Jing Mo	iOS Club Summer Camp	August,2019	Xiamen University
Xingtong Wei	iOS Club Summer Camp	August,2019	Xiamen University
Zirui Sang	iOS Club Summer Camp	August,2019	Xiamen University
Tong Zhang	iOS Club Leadership Camp	January,2020	Shanghai Business School
Yanyin Mei	iOS Club Leadership Camp	January,2020	Shanghai Business School

5   Conclusions

Based on the construction of Emerging Engineering, this paper discusses the way and scheme of Swift certification for application-oriented undergraduate students. This paper first introduces the path of Swift certification for application-oriented undergraduate students based on Emerging Engineering construction, then lists the achievements in detail, and finally summarizes the project. In a word, this project has achieved a lot of achievements, students in the academic level, technical ability and other aspects have made significant progress and improvement, to achieve the purpose of the construction of Emerging Engineering, is also a beneficial attempt to the construction of Emerging Engineering.

References

[1]Hou,R.Z.(2020) Swift programming language features and application analysis. Computer Knowledge and Technology,16:62-63.DOI:10.14004/j.cnki.ckt.2020.0278.
[2](2017)"Emerging Engineering" building Fudan consensus. Research in Higher Education of Engineering,(01):10-11.
https://kns.cnki.net/kcms2/article/abstract?v=3uoqIhG8C44YLTlOAiTRKibYlV5Vjs7iAEhECQAQ9aTiC5BjCgn0RmVG11GYfavrbcfa58Rq89VKda_OHsePv0CGt7RLV_R1&uniplatform=NZKPT.
[3](2017)"Emerging Engineering" construction action line ("Tianda Action"). Research in Higher Education of Engineering ,(02):24-25.
https://kns.cnki.net/kcms2/article/abstract?v=3uoqIhG8C44YLTlOAiTRKibYlV5Vjs7iAEhECQAQ9aTiC5BjCgn0RmVG11GYfavrJyYZdiKoa4klILcmk3-IEzud0I0de0gE&uniplatform=NZKPT.
[4]Ding,L.Y. (2022)Discussion on the Cultivation of Compound Emerging Engineering Education Talents Oriented to Digital Economy. Research in Higher Education of Engineering, (06):1-4+24.
https://kns.cnki.net/kcms2/article/abstract?v=3uoqIhG8C44YLTlOAiTRKibYlV5Vjs7iJTKGjg9uTdeTsOI_ra5_XXylWFQZFqUCDyaRfamq1A2XN8BVv1iyWUfn2gv9KDZD&uniplatform=NZKPT.
[5]Wang,X.C., Huang,D.R. (2022)Historical Homology and Co-opetition Types: Clarifying and Reshaping the Relationship between Tertiary-level Vocational Education and Application-oriented Undergraduate Education. Journal of National Academy of Education Administration, (09):30-37+83.
https://kns.cnki.net/kcms2/article/abstract?v=3uoqIhG8C44YLTlOAiTRKibYlV5Vjs7iJTKGjg9uTdeTsOI_ra5_Xc5qns_uLvj-dA9OmT4hRF1HlGPJlXRX5DvlwIO5GNkc&uniplatform=NZKPT.
[6]Zhang,F. (2015)Research on migration from Objective-C to Swift. University of Chinese Academy of Sciences, Beijing.
https://kns.cnki.net/kcms2/article/abstract?v=3uoqIhG8C475KOm_zrgu4lQARvep2SAkVNKPvpjdB

oadmPoNwL-
RuZ2RLD-ovZZi2WfKXSuT-PIKwMGME-8BC_PVruZLKarM4&uniplatform=NZKPT.

[7]Apple Inc,(2022) Swift. https://developer.apple.com/Swift/.

[8]Yao,J. (2019)A Brief discussion on the Cultivation of software engineering innovative Talents --
Taking iOS Student Club as an example. Journal of Hubei University of Economics (Humanities and
Social Sciences),16(11):129-130.
https://kns.cnki.net/kcms2/article/abstract?v=hxQbSE9N8QcJb1bE-OfldP2t2IrUFfEqhMmOfCiOIWe
YU73y2p0Iyc4ZNuJxIt3cZkna8oQSc0HSv8Jjqu2W4MIoPbWS6ITCJX2Bm2QH5LyaLBLOoQc028
yiHi9QilhTZedvabT0blw=&uniplatform=NZKPT&language=CHS.

[9]Ministry of Education of the People's Republic of China. (2015)Suggestions on strengthening the
application and management of online open courses in colleges and universi-
ties.http://www.moe.gov.cn/srcsite/A08/s7056/201504/t20150416_189454.html.

[10]Computer Education Research Association of Chinese Universities. (2022) Notice of the 7th
(2022) "China Collegiate Computing Contest - Mobile Application Innovation Contest".
http://www.appcontest.net/.