

FINAL REPORT OF THE EXTERNAL JOINT INTERNATIONAL ACCREDITATION

University: East China University of Science and Technology

Program: Chemistry

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I. Major Profile

The Chemistry program of East China University of Science and Technology (ECUST), though young, has a high starting point and solid scientific research foundation with sufficient faculty and fund support. The school has been constantly working on new modes of talent training and already put Academic Credit System in practice at an earlier time. It is also one of the first pilot schools for Top Talents Cultivation Projects for 8 years of Joined Study of Bachelor and Doctoral Degree, with high quality of core specialized curriculum and successive improvement of students' resource for years. It lays stress on its connotation construction and conducts systematic survey of teaching quality with comprehensive and in-depth analysis. It has practiced well in the aspects of quality engineering construction, quality supervision and assurance system construction, the implementation of basic teaching norms, etc.

II. Site-visit and Feature Highlights

This time, the ERP conducts the site-visit by closely focusing on the 5 degrees according to 7+1 first-level indicators and 30 second-level indicators. Before entering the school, the ERP conscientiously reviewed the self-evaluation report provided by the school and the data analysis report of program teaching status, and respectively wrote the Experts' Feedback on Reading Materials before Entering the School". During the site-visit, the expert panel held working meetings for 4 times, attended 15 classes, read 103 graduation theses (including graduation design), 831 exam papers of 17 courses, read 23 management documents of the University and School, teaching archives, supporting materials, etc., interviewed 42 students, 35 teachers, 6 program leaders, 13 school leaders and management personnel, 15 University leaders and heads of functional departments, and 38 employers and alumni, and also

made an on-the spot investigation to the basic chemistry laboratory, chemical engineering laboratory, teaching control room, library and other basic teaching facilities.

After full discussion, we agree that the Chemistry program of East China University of Science and Technology (ECUST) has clear school-running advantages and characteristics:

1. Teachers have a clear conception of the Outcomes-based Education. The Chemistry program has been actively engaged in putting the concept of the Outcomes-based Education (OBE) into practice. Its training objectives, in line with the school-running orientation, fit in with the needs of the economic society and can serve the strategic needs of national and regional development. The teachers and teaching administrative personnel have a profound knowledge of OBE concept and can organically combine their own work with graduation requirements.

2. Technical support is fully provided for teaching and management. The university and the Chemistry Program actively adopt information technology means to promote teaching quality and management efficiency. As for the university, the information technology means have been applied to new teaching methods for higher class efficiency and to the teaching assessment software for supervisors to give efficient feedback after attending classes. As for the school, the information technology has been applied to upgrading traditional excellent courses. With the aid of information-based means like MOOC, the problem-oriented concept has been integrated into the curriculum design, which improves the students' independent learning ability and learning initiative.

3. The experiment teaching has a solid base. The Chemistry program attaches great importance to experiment teaching and has an exquisite and comprehensive scoring system for experimental lessons, involving the links of preparation before classes, operational norms and experimental results, etc., which can strengthen the students' experiment skills. Meanwhile, it also puts

emphasis on the design of experimental projects by actively converting teachers' scientific research to innovative experiments so as to broaden the students' mind. The students can also improve their own manipulative ability and innovative thinking by independently designing innovative experiments through USRP project.

4. School-running funds and conditions are provided with strong support. The program has sufficient funds for school-running, scientific researches and teaching reform to meet the graduation requirements effectively. It also has high-level laboratories and provides students with sound experiment conditions.

5. The work of teaching and research sections is carried out steadily. Four teaching and research sections undertake the basic courses of the university and the program and work solidly, and inherited the outstanding teaching tradition. Excellent faculty is the strong backing for the Chemistry program and has been playing a significant role in school-running. The program has a group of high-quality teachers and professors, including academicians, national teaching masters, Changjiang Scholars, etc., to take a large proportion of the basic courses of junior grades and essential courses of this program, which guarantees the research-oriented teaching can be applied to the whole teaching process.

In conclusion, the Chemistry program of the university has an outstanding discipline advantage, trains high quality talents, has made great achievements on its path of research-oriented teaching reform and built a talent training system with solid basic knowledge and excellent experiment skills. The achievement degree of the training objectives and training results of the program is high.

III. Compliance of the External Review Outcomes with Standards

STANDARD 1. Educational Objectives

1.1 Orientations of educational objectives: consistent with mission of the institution, meet the needs of the society, contribute to the national and regional development strategies, embody the international vision, and reflect the features of being forward-looking and leading.

1.2 Clear, measurable and attainable educational objectives which can reflect the expectation of graduates, the features and strengths of the program.

1.3 A mechanism that evaluates educational objectives regularly and amends based on the evaluation results timely.

Achievements:

(1) The Chemistry Program has been actively engaged in putting the concept of the Outcomes-based Education (OBE) into practice. Its training objectives are in line with the school-running orientation and fit in with the needs of the economic society. The graduates have solid specialty knowledge and have been well received in the industry. The teachers and teaching administrative personnel can organically combine their own work with graduation requirements and constantly put the concept of “students-centered” into practice.

(2) The educational objectives are in line with the school-running mission. It lays emphasis on the foundation of knowledge, humanistic quality, scientific research and practical ability, with clear requirements for the students’ basic knowledge, quality and ability. It offers a definite employment direction and builds a quality evaluation mechanism for both inside and outside the university, by which they can make adjustments in time according to the evaluation results.

Challenges and deficits:

(1) There are deficiencies in the perspectiveness and guidingness of its training objectives. Its training objectives haven't clearly embodied the orientation of training "social elites", which does not closely agree with the national plan of "Six Outstanding and One Topnotch". The connotation of "Compound Talents" in the talent-training objectives is not specific and does not give a clear intellectual orientation of specialty training: training talents for fundamental research or applied research, or applied talents.

(2) There are deficiencies in the innovation and international vision of its educational objectives. Its intellectual orientation of specialty training is "compound talents", which does not fully reflect the connotation of innovation, leadership, etc. The "international communicative competence" it involves is not quite equivalent to the "international vision" that social elites should have. Based on this orientation, its talent training system is slightly traditional and conservative.

(3) There are deficiencies in the exploration of the advantages of the program. The present advantages are restricted to the program itself, not conducive for students to improve their social adaptive capability. It's easy to lose sight of the line between the orientation of "science and engineering combination" and the Applied Chemistry program. The program advantages and characteristics need to be further explored.

Recommendations:

(1) Take a full account of the association among traditional skills, present status and future trends, and find a balance point in teaching. For instance, while paying attention to training the students' traditional skills (like titration), we should also lead the students to think about what kinds of experimental methods and skills are more important when the automatic titration has already been fairly common nowadays.

(2) Broaden the horizon when adjusting the training objectives, and take the initiative to keep abreast of the development strategy of the nation and Shanghai. Be specific about the changing situation of higher

education at present, i.e. changing from the basic support into the balance between support and guide, in order to be a top-ranked and distinctive Chemistry Program nationwide.

(3) Further explore the school-running characteristics and advantages.

Take advantages of the industry and geography to explore subject characteristics and adapt them to the students' employment and development.

STANDARD 2. Graduate Outcomes

2.1 Possession of the humanity, the scientific spirit, the professionalism and the sense of social responsibility. Understand the nation, the society, and the people. Practice of core socialist values.

2.2 An ability to understand and apply solid foundation, specialized knowledge and necessary research methods. Understand knowledge of the latest development and trends of the program and the relevant fields;

2.3 Critical thinking, innovative spirits and competence. An ability to identify, analyze, question and evaluate the phenomena and the problems concerning the programs and the relevant fields. An ability to express individual opinions.

2.4 Complex problem solving. An ability to solve the complex the complex problems, to conduct comprehensive analyses and researches in the programs and to propose relevant measures or solutions;

2.5 Modern tool usage. An ability to apply modern IT methods and tools properly in solving practical problems.

2.6 Communication skills. An ability to make effective oral and written communication with the peers and the public.

2.7 Teamwork and cooperation. An ability to get along harmoniously and to work cooperatively with team members. An ability to play contributive roles in team as either a member or a leader;

2.8 International horizons and awareness. Understand international dynamics and care of global issues. An ability to know and respect the differences and diversities of world cultures.

2.9 Lifelong learning. An ability to carry out the self-management and the independent learning. An ability to adapt to the society and to achieve the individual sustainable development by carrying out continuously learning.

Achievements:

(1) **Solid experimental ability.** The Chemistry Program attaches great

importance to experiment teaching and has an exquisite and comprehensive scoring system for experimental lessons, involving the links of preparation before classes, operation norms and experimental results, etc., which strengthens the students' experiment skills. Meanwhile, it also puts emphasis on the experiment design by actively converting teachers' scientific research to innovative experiments so as to broaden the students' mind. The students can also improve their own manipulative ability and innovative thinking by independently designing innovative experiments through USRP project.

(2) Long period and high requirements for the completion of the graduation theses. The graduation theses reach a high level on the whole, not only in compliance with the writing requirements but also with good written language and English. It plays a positive role in cultivating students' scientific literacy and fairly supporting students to solve complex problems, comprehensively apply knowledge and information technology, develop international communicative competence and learn about the frontier field of the discipline, etc.

(3) A variety of elective courses for this program. The elective courses can be organically integrated with the teachers' scientific research and reflect the current status of the scientific frontier.

Challenges and deficits:

(1) The way of training students' innovation ability is single. It is not comprehensive for the program to use "problem-analysis ability" and "research ability" to explain innovation ability. Although the scientific research training can help the students to develop their innovative thinking, it is still required for the teachers to be bold in making breakthroughs and innovation in the teaching contents and methods constantly, for the purpose of training students' innovation ability.

(2) The interpretation of international vision is not comprehensive. As is stated in the graduation requirements, the international vision is included in

“communicative competence”, and mainly supported by courses like “College English”, “English for Science and Technology”, Graduation Practice, etc. However, it is discovered in this site-visit that the students' acquisition of international vision is closely related to the local culture, campus culture and the second classroom. The program needs to make a more comprehensive study and a more detailed analysis about the cultivation of international vision and accurately grasp the connotation of chemistry programs' international vision so as to have a definite object in view and conduct effective training in the course of talent cultivation.

(3) There are deficiencies in the cultivation of students' communication and expression abilities. The cultivation of students' communication ability is not embodied in the training program or the course syllabuses. There is a little interaction between teachers and students in the classroom and a lack of a systematic plan and practice for training students' communication and expression abilities in the specialized course teaching.

(4) There is a slight deficiency in the cultivation of students' humanistic connotations. There are few credits for the general courses in the design of course system whose coverage is quite narrow.

Recommendations:

(1) Change the teaching methods in classroom. Relying on the leading role of the teaching and research section in teaching, take the initiative to change, to upgrade present excellent courses by adding innovative elements, to apply the information-based teaching means like MOOC and promote the application of blended teaching and “flipped classroom”, so that the students can develop the abilities essential for innovation and entrepreneurship like interdisciplinary thinking and communication ability.

(2) Pay more attention to the subtle influence of the second classroom on students. Based on the subject characteristics, hold more activities of the second classroom that students love to see and hear, make a profound summary about what

positive effects these activities have on broadening the students' international vision and take full advantage of Shanghai as an international metropolis to broaden their international vision.

(3) Integrate specialized courses and reduce the number and credit hours of these courses. Increase the number of general courses and extra-curricular activities. Through these association activities, students can not only improve their organization and management ability, but also the communication and coordination ability.

(4) Further raise the proportion of the students participating in social and overseas exchange activities. Cultivate the students' ability to think internationally and to take part in the international communication and cooperation.

STANDARD 3. Curriculum

3.1 Consideration of the requirements of national qualification framework descriptors in the study program. Availability of senior staff to core courses and Teaching Assistant to compulsory courses.

3.2 Availability of a documented assurance system providing continuous enhancement of classroom teaching with student development. Graduate outcomes Implementation of program syllabus for learning outcomes. Effectiveness of teaching procedures for student involvement, with dialogue, critique and discussion. Implementation of examinations and tests for assessment of learning outcomes.

3.3 A practical-oriented teaching system featuring academe-industry cooperation. Hands-on training with executive departments, research institutions and industrial departments for improvement of practical ability, innovation and entrepreneurship and the ability to solve practical problems with knowledge learned.

3.4 Regular evaluation and corresponding revision of the curriculum. Involvement of employers and graduates during curriculum reviewing and revision.

Achievements:

(1) **This program has a complete course system.** It lays equal stress on the development of the Chemistry discipline itself and its combination with Chemical Engineering, Materials, Life Science, Energy, Environmental Protection and other disciplines, forming a course system that centers on Chemistry and Applied Chemistry in combination with Science and Engineering.

(2) **The curriculum's archive management work is carried out steadily.** The Chemistry Program has its exam papers filed properly by having them bound in order and analyzed in detail, and has a fairly complete archive of the course materials, which facilitates the continuous improvement of the course quality.

(3) **The teachers' explanation is detailed and orderly.** Through class visiting, it is noticed that teachers can integrate their research findings into the teaching contents, which is conducive for students to expand their ideas on the

scientific research, and students are absorbed in the class.

Challenges and deficits:

(1) The course system needs to be innovated. In the 21st century, the higher education curriculum system should be based on the disciplinary development and pay attention to its frontier and trend. The Chemistry program is a basic subject but still needs to change with the times by providing some new courses, such as Metachemistry, Chemical Kinetics, etc., so as to broaden students' horizon and scope of knowledge and make them closer to the frontier field of the discipline and enter society with unique disciplinary knowledge vision as university students of the new era. However, the current course system lays too much emphasis on its specialized courses, with low proportion of general courses. Both students and teachers do not fully realize the necessity of general education.

(2) Bold reform should be made on the experimental curriculum. As the instrument equipment and the information technology are changing rapidly nowadays, it's not enough to train the students of this new era with the traditional experimental methods and techniques used in 20th century. Instead, it requires great efforts on adding new methods to the experiment training for students.

(3) The curriculum should balance the different needs of students. The specialized course system is mostly scientific research oriented and puts emphasis on training students' scientific research ability. Although the rate of pursuing advanced studies is high, nearly half of the students choose to work after graduation. Therefore, these students' needs should be taken into consideration during curriculum design, and there should be some courses closely related to the industry, which is also a way to broaden students' horizon and leading them to combine theory with practice.

(4) The graduation requirements should be further realized. Taking physical chemistry as an example, there are multiple requirements for it listed in the training program, including strong support of basic knowledge, medium support of problem analysis, research and lifelong learning abilities, weak

support of the ability to use modern tools, have sustainable development consciousness and communicate with individuals and teams. However, as for the physical chemistry, its course syllabuses, teaching calendar and examinations do not embody such links of graduation as autonomic learning, literature consultation, group learning, course reports and theses. It's impossible to see how these abilities and qualities can be put into practice. The course examination includes class attendance (10%), assignments (40%), mid-term examination (50%) and final examination. The examination types are not enough and the examination questions are mostly settled and not comprehensive. Besides, the examination lays particular stress on low-level learning, like memorizing, comprehension, application, etc. but neglects the high-level learning, like analysis, judgment, innovation, etc. Consequently, there is no way to verify if the teaching objectives have been achieved or not. This is also a common phenomenon among other courses.

(5) The teaching methods are relatively old. It basically adopts the teacher-centered infusion teaching method, only with few questions raised during the teaching. The teaching remains at a low level where the students keep silent and raise some questions and has not reached a high level where students can discuss and debate. The teaching effect is influenced by the challenging teaching methods and the students' low degree of participation.

Recommendations:

(1) Set the courses for the future. The Chemistry Program has already had high-quality theoretical and experiment courses and formed a good teaching culture, which lay a good foundation for course reform. The school should actively changes its idea for the top-level design and be proactive in face of the new requirements and skills of Chemistry so as to promote the upgrade of current courses.

(2) Fully rely on the strength of the discipline and promote the changing of teaching contents. The strength of the Chemistry Program can powerfully promote the development of the academics and industry. The recommendation is to integrate

the new concepts, new methods and new results behind the discipline development into the traditional teaching contents, textbooks and classrooms. By means of the “combination blow” of integrating the achievements in scientific research into textbooks and classrooms, the students can develop their innovative consciousness, spirit and ability.

(3) Through administrative means, further make the graduation requirements practicable in the courses. The graduation requirements need to be revised to better meet the 3-level accreditation standard, which has become a common goal of all teaching staff. Specify the courses’ status and role. The teaching and research section organizes the discussion of the ways to put courses into practice and the examination types. Improve the teaching procedures and assessment methods so as to design the teaching and examination in accordance with the OBE concept.

STANDARD 4. Faculty

4.1 Faculty with sufficient amount and rational structure. Qualification and competent of the teaching staff for undergraduate teaching with good teaching and researching experiences. Capacity building and development of teaching staff meet the needs of student development.

4.2 Regulations and measures to encourage teachers' commitment to undergraduate teaching, and guarantee sufficient time and effort in classroom teaching and student tutoring. Availability of professors engaging in undergraduate teaching.

4.3 Two level systems for career development and professional advancement for teachers. Participation of the teachers in joint international projects, internships home and abroad, and regular innovative teaching methods and advanced technologies.

4.4 Availability and use of clear, transparent and objective criteria for self-evaluation, student evaluation, peer evaluation, supervision evaluation, and other evaluation activities annually. A system of assets allocation and promotion linked to evaluation results.

4.5 Research activity of the teaching staff including program development, curricula and test books building, teaching method and technology improvement conducted by a teaching monitoring committee; implementation of research results in the academic process.

Achievements:

(1) **The program has a strong teaching staff.** The Chemistry program has a first-class teacher team, including academicians, national teaching masters, Changjiang Scholars, Outstanding Youth Scholars, a group of high-quality teachers, etc. It has nearly 30 full-time staff working in the labs. And the number stays ahead of the experiment teaching in domestic universities.

(2) **The work of teaching and research sections is carried out steadily.** Four teaching and research sections are well organized with persons in charge, can undertake the basic courses of the university and the program and design

course content according to different teaching objects. The teaching and research sections lay emphasis on the outstanding teaching tradition and can pass on their experiences to new teachers effectively.

(3) There are incentive system and measures for teachers to undertake the undergraduate teaching. There are two levels of teacher training systems set by the university and the school respectively and a comprehensive evaluation mechanism for teaching quality, by which all kinds of teaching quality evaluation activities are practicable.

Challenges and deficits:

(1) The teaching management system remains to be further designed. As for the development needs, Chemistry is the major discipline of ECUST. Considering from this, the program should strengthen the construction of a high quality teaching team and the academic level of new teachers need to be improved. There are 35 teachers for now and their teaching workloads are very heavy, which is not good for them to improve their teaching ability. Some teachers have rich teaching experience and great input of teaching but cannot get promoted smoothly.

(2) The organization structure of the school needs to be further clarified. The school consists of two departments which have their own teaching and research sections. Besides, there are three programs and research institutes under the departments. It's necessary to consider seriously how to define the functions of the teaching team and the scientific research team so that they can cooperate effectively in the teaching. As for the current organization structure, the person in charge of a program may not be in charge of the department. It also happens that the teacher who teaches basic specialty courses for the whole university belongs to the Chemistry Program. All of these contribute to the teachers' heavy workload. The function of the program as the basic unit of training talents needs to be strengthened.

(3) The teacher management mode needs to be reformed. The Chemistry Program has 35 teachers who are managed by the school but not the program, which is quite different from that of other comprehensive universities. The program's

connotation and denotation are not clear, which makes it difficult to formulate the development plan for both the program and the specialized teachers and is not conducive for the program's development in the long run.

(4) The teacher training is not so guiding. The teachers' development lays particular stress on the examination of qualification certificates and specialty teaching training but neglects the application of new techniques and methods. The evaluation index, with low combination of OBE, focuses on the input of teaching rather than the output of capability.

Recommendations:

(1) Strengthen the top-level design. The school top-level should give full consideration to the orientation of talent cultivation and the interaction between teaching and scientific research in the process of talent cultivation, so as to clearly define the function of the program's organization structure and effectively balance the relationship between teaching and scientific research, between public teaching and specialty teaching, between scientific research training and practice.

(2) Cater to the improvement of teachers' teaching ability. Organize all kinds of trainings related to teaching idea, teaching methods and teaching techniques.

(3) Manage the teachers of public courses separately. Make development plan for specialized teachers according to the needs of specialty development and talent training and promote the interdisciplinary teaching after the teachers' positions have been specified, which is favorable for the program's development in the long run, especially for the construction of a top-ranking program.

(4) Guarantee the instructional teachers' promotion channel. For the last two years, the university has been providing the teachers who are good at teaching with a promotion channel, but there has not been a long-term, stable and effective mechanism to stimulate some teachers to devote themselves to the undergraduate teaching.

STANDARD 5. Teaching and Learning Resources

5.1 Effective use of systems and measures to guarantee adequate and annually increased funds for program teaching. Availability of sufficient funds for student practicum and graduation thesis (design) so as to meeting the needs of teaching.

5.2 Availability of sufficient leading teaching facilities, abundant book resources and up-to-date teaching information technology in accordance with the demands of students' learning and teachers' teaching. Availability of management, maintenance, update and sharing mechanism for convenient use for teachers and students. Availability and accessibility of research labs open to undergraduates

5.3 Availability of extensive social resources, stable and sufficient practicum and training sites to provide long-lasting and effective support and guarantee students' hands-on practice, innovation and entrepreneurship training.

Achievements:

(1) **The running funds of the program are sufficient.** Some relevant regulations specify that teachers can use some scientific research funds to guide the students to do scientific researches. A great amount of money has been invested in the laboratory construction. There are four chemistry laboratories with ample space and lots of experimental equipment. For example, as for physical chemistry experiments, normally a university will be equipped with 4 to 6 sets of equipment, 4 sets for use and 1 to 2 for standby, while ECUST has 24 sets of fairly new equipment. Being able to develop instrument and equipment independently is a really good support for teaching reform, especially for the experiments of physical chemistry and chemical engineering principles.

(2) **The number of off-campus internship bases is sufficient,** which enables the contents of graduation practice to be relatively abundant. The graduation practice can last for 6 to 7 weeks.

(3) **With a course platform built** and being a member of the Course Sharing Union of Colleges and Universities from East and West China, it has made

outstanding achievements in the introduction of National Top-Courses and excellent resources sharing courses. It has started the construction of MOOC and begun to promote the teaching model of combining the online and offline teaching.

Challenges and deficits:

(1) The students from the first, second and third grades of this school are mainly cultivated in Fengxian Campus, and the fourth grade students move to Xuhui Campus. The teachers and teaching resources of the two campuses need to meet the demands of students from different grades. At present, the program laboratories are mainly located in Xuhui Campus and it's not convenient for non-graduating class students to have access to these program laboratories.

(2) The off-campus internship bases are not diversified. In addition to the internship, it is necessary to introduce the training conditions and teachers for innovation and entrepreneurship through coordination.

Recommendations:

(1) The school should strengthen the support for the students to do experiments across multi-campus, and reduce the time and cost that the students need for travelling between two campuses as much as possible by means of providing more school buses, increasing subsidies and so on.

(2) Strengthen the construction of innovation and entrepreneurship platform, and have further cooperation with companies for talent training.

STANDARD 6. Quality Assurance

6.1 Availability and effectiveness of a well-structured teaching quality assurance system at both levels of schools and university With clearly specified objectives and tasks, complete mechanism, and clearly allocated responsibilities to specific personnel.

6.2 Use of clearly defined quality criteria in all teaching process with regular monitoring. Effectiveness of procedures for self-evaluation and periodic review of a study program.

6.3 Availability of IT technology for collection and comprehensive analysis of relevant quality information. Availability and effectiveness of the analysis result for continuous improvement of study program and support the development of quality culture seeking for excellence.

Achievements:

(1) The quality assurance system has been established fundamentally. The class visiting and teaching assessment system runs fairly well. The teachers can discuss the course quality, visit classes and review the exam papers and theses interactively. Young teachers can inspect and learn from the model lessons of the excellent teachers. By way of all these means, the quality culture construction can be gradually strengthened among the teachers and students.

(2) The feedback can be timely collected from the graduates, alumni and employers, and then the training program can be revised accordingly.

Challenges and deficits:

(1) The standards for course construction are not very explicit. The network resources of courses have not been constructed in a large scale yet and only 23 courses have websites whose login and using effects are not quite ideal though. The teaching assessment standards have neither been transformed from

teacher-centered into student-centered, nor from input-oriented into output-oriented.

(2) The quality management work needs to be specified. It's found during the site-visit that the evaluation modes of some courses are inconsistent with the course syllabuses. Some are exam courses as stated on the course syllabuses but turn out to be the courses without exams in practice, which lessens the guiding and binding effects of the course syllabuses.

(3) The course assessment needs to be normalized. Neither examination outlines nor the analyses of the effects that the exam papers have on the teaching objectives assessment have been provided. There is no evaluation system for the exam papers' quality. Exam and assessment are two important means to examine students' learning effectiveness. However, the researches show that more than 50% of the courses employ the means of assessment and there is no standard for some assessment scoring, especially for the regular grades.

(4) The design of teaching incentive chain needs to be further rationalized. Teaching and the scientific research contradict with each other but are not totally opposite. "More emphasis on scientific research than on teaching" is not the inevitable result. At the present stage, teachers attach more importance to scientific research largely because of the design of teaching incentive chain. Teachers will definitely spend more time and energy on scientific research when the teaching incentive chain is too short and does not work longer with good effect but the incentive chain of scientific research is encouraging on the contrary.

Recommendations:

(1) Enforce the examination and approval of the course syllabuses. It should be specified that the course syllabuses should not be modified freely once being approved. A revision system should be built to ensure the smooth implementation of the teaching plan when there is a need to modify the course syllabuses in practice.

(2) Further normalize the course assessment requirements. Go through each course's assessment mode and check if the mode is effective for examining the

situation of course objective attainment. Normalize the requirements and standards for the assessment so that it can be graded accordingly.

(3) Establish a long-acting incentive mechanism. The teaching management should learn from the scientific research management which arranges a long value chain for scientific research. It is about the effective management and incentives in essence – incentives for getting a scientific research program, getting funds, publishing an article, getting a patent, concluding a report and winning an award. By contrast, the teaching management is rather monotonous without a lot of incentives and cannot motivate teachers to concentrate on teaching.

STANDARD 7. Student Development

7.1 Student development Systematic regulations at the recruiting and selection of excellent applicants. Availability and effectiveness of rules and regulations for teaching administration and student development, which consider needs of diverse groups of students.

7.2 Systematic and effective guidance and service to support students' progression covering mental tutoring, academic instruction, career consultation and entrepreneurship incentive.

7.3 Attainment of the expected graduate outcomes. Satisfaction of formative and summative assessment, including learning experience, learning outcomes, personal development and employment and satisfaction of employers.

Achievements:

(1) The follow-up survey is comprehensive. The school conducts a multi-dimensional survey towards the graduates and the employers, and can collect the feedback from graduates and employers in a comprehensive way. The graduates and the employers are basically content with the quality of professional talent training.

(2) There is a starting point for the innovation and entrepreneurship education. ECUST has established a 3-level platform of the innovation and entrepreneurship which integrates all-round cultivation, specialized training and competition guidance into one. The school of chemistry has established more than 200 projects on USRP and over 100 projects on the platform of the college students' innovation and entrepreneurship, and keeps a high award rate in various competitions.

(3) Both the teachers' and the students' initiative is stimulated effectively. The school links the students' innovation and entrepreneurship activities with the credits, courses, postgraduate recommendation and other learning links, which stimulates the enthusiasm of students on innovation and entrepreneurship. The school also incorporates the teachers' instruction work into their performance evaluation to

motivate the teachers. Therefore, all of these methods can create the campus culture and environment for innovation and entrepreneurship.

Challenges and deficits:

(1) The students' communication abilities need to be improved. The employers admit that the students of this program can work steadily but also state that the graduates should improve their communication abilities. Sometimes the students are too practical and neglect to discuss principles, so it will be hard for them to grasp the meaning of things in a comprehensive way. This is not conducive for the students to communicate effectively when they're working.

(2) The support system for the students who have learning difficulties is not perfect. There is a lack of personalized guidance for the students, and the support for students to take elective courses of other programs is not enough.

(3) The mechanism for the students' academic and career guidance needs to be strengthened. It is necessary for students to have a clear personal development goal and the conscientiousness and initiatives needed for their independent development.

(4) The guidance and support for the students who pursue a career are not sufficient. There are no program-oriented courses or relevant elective modules to be set and no effective service to be provided to the students who have different development orientations. The regulation about students' changing programs and taking elective courses of other programs is still quite rigid. The proportion of guiding students to study for a second Bachelor's degree is rather low.

Recommendations:

(1) Reform the curriculum system. Encourage students to take more general humanistic courses and participate in more social practices. Organize specialized activities to cultivate students' communication and expression abilities.

(2) Strengthen the construction of the support mechanism for students in difficulty. By way of this mechanism, the students can help each other. Pay more

attention to the students from remote areas and minorities.

(3) Eliminate the restriction of 5% changing program. Reduce the teaching time in class and leave more time for students to reorganize their knowledge and develop thinking, at the same time, make the second Bachelor's degree and the major-minor courses available for students so as to train “compound talents” in a better way. Offer a dual degree and the major-minor courses, reduce the restrictions of changing program, and extend the students’ rights to freely choose programs, especially after the implementation of students enrollment by the large classification of academic subjects.