



Analysis of iTeach 2017 Contest Works and Suggestions for Educational Technology Students Training

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To cite this article:

Xu Chaojun, Guo Shaoqing, Bai Hongquan, Li Yi. Analysis of iTeach 2017 Contest Works and Suggestions for Educational Technology Students Training. *American Journal of Information Science and Technology*. Vol. 3, No. 1, 2019, pp. 26-34. doi: 10.11648/j.ajist.20190301.14

Received: January 13, 2019; **Accepted:** March 14, 2019; **Published:** April 10, 2019

Abstract: iTeach contest works is the display window of educational technology students' ability of instruction design, computer programming, software UI, and so on. It can also give out lots of information about China educational technology curriculum implement status, and students training focuses. The analysis of iTeach contest works is not only an inspection of the training quality of educational technology students, it's also a process of communication of training experience of educational technology students. The article takes 196 educational technology students' works from 2017 annual contest as samples, and conducts quantitative statistics from six aspects, including qualifications of contestants, work types, target users, distribution types and authoring tools. The analysis of the works shows there are many fresh work topics, creatively used technologies, specific information technology application in the contest works. The statistics also reveal some points should be paid attention to during the course of educational technology student development. Lastly, based on contest experts' interview, the article puts forward some suggestions for educational technology student training, including the reflection of curriculum structure, the construction of authentic curriculum resources, the implementation of curriculum quality standards, the integration of practical teaching system and scientific research feeding back teaching.

Keywords: Works Analysis, Educational Technology, Student Training, Practice Teaching, Authentic Resources

1. Introduction

iTeach National Digital Education Application Innovation Contest is an annual contest organized by the China Educational Technology Teaching Council (CETTC) for college students from all over the country, mainly facing the major of educational technology. The contest aims to encourage more college students to care about education development, to enhance their innovation awareness in their course training, to cultivate teamwork spirit, and to stimulate their interests in learning. So, iTeach contests works preparation helps to improve students' overall abilities in integrating what they have learned into various kinds of works' design and development [1-2].

Contest works from different majors characterize their curriculum plans and students' training objectives [2], and we can also find the academic frontiers they are caring about.

Furthermore, the merits and demerits investigated out from current contest works are very helpful not only for next round contest students' works instruction, but also have much guiding significance in students training. So, the statistics and analysis of the annual contest works are necessary to improve the quality of future contest works, and are helpful to the construction and optimization of educational technology curriculums and student instruction as well [1, 3].

Qualitative methods are used in this article to account and analyze students' works. The statistics are based on five aspects, including qualifications of contestants, types of works, work target users and topics, distribution types, authoring tools, object orientation and topic sources. These qualitative indexes give out many information about educational technology major students training, such as instruction design & application, software tools used in ICT and curriculum development, educational software development, up-to-date big data in education, education

intelligence, and so on.

Another key point of this article is the suggestions drawn out from the contest works and advices given by contest experts. These advices include educational technology curriculum structure reform, curriculum quality assurance, authentic curriculum resource building, practice teaching mechanisms integration [4] and science research feeding back teaching [5].

The works of the contest came from 109 colleges and universities of 29 provinces and municipalities of China, 1,076 in total. After the primary assessment by 94 experts, the top 270 works entered the final contest. At last, 247 works participated in the live presentation. Among them, 196 works' authors majored in educational technology. This article's statics and analysis are based on these 196 works. For details, see table 1.

Table 1. Type of contest works.

Types	Preliminary works		Final works		Woks from educational technology	
	Quantity	Percent	Quantity	Percent	Quantity	Percent
Knowledge resources	746	69.3%	174	70.4%	133	67.9%
Supporting Tools	231	21.5%	51	20.6%	44	22.4%
Software System	49	4.6%	12	4.9%	11	5.6%
Project solutions	50	4.6%	10	4.0%	8	4.1%
Total	1076	100%	247	100%	196	100%

2. Contest Works and Data Collection

2.1. Type Definition

iTeach 2017 is the first contest hosted by Nanjing Normal University. There are four types of contest works, which are knowledge resources, supporting tools, software systems, and project solutions. Each type of works includes the following subtypes and requirements.

2.1.1. Knowledge Resources

Knowledge resources works mainly refer to those single or serial instruction videos and animations for knowledge representation. The develop technologies include videos, animations and virtual reality works.

2.1.2. Supporting Tools

Supporting tools are those small interactive learning supporting software, like App, interactive CAI (CAI, Computer Assisted Instruction) courseware, serious games and Miroworld games [6]. These tools focus on the instruction of one or a group of knowledge, and most of these tools are not connected to Internet, nor supported by any database.

2.1.3. Software Systems

Software system is somewhat more complicated software or platforms which can support a whole instruction process or series of activities, mostly with Internet and database supported. These works are developed by newly network programming tools or open social network APIs (APIs, Application Programming Interfaces).

2.1.4. Project Solutions

Project solution works are mainly integrated solutions, products, instruction plans for solving typical problems in practical instruction activities, such as key instruction point or difficulties in classroom instruction. This type of work emphasizes the supporting role of information technology and digital resources in teaching & learning.

2.2. Data Collection and Processing

The data of the contest works is derived from the information submitted by the contest students. The data items are structured as following.

Work = {name, type of work, distribute type, topic source, object orientation, authoring tools}

Team = {caption information, team major, member education, team school, team area}

Work Type = {knowledge resources, supporting tools, software system, project solutions}

Distribution Type = {micro video, app, animation, networked course, online course, teaching system, courseware, solution, educational game}

While labeling the information of each contest works, we did not comply above work classification rules strictly, so as to preserve the works' original characteristics, creative ideas, design methods and new technologies applied in the works.

3. Work Descriptive Statistics and Analysis

Quantitative data such as quantity of each type of works, qualifications of contestants, types of work target users and topics, work distribute types, authoring tools, topic sources not only reflect the hobbies and professional abilities of educational technology students, and also show the training of professional skills of them. After each statistic, the article explains the data and educational technology students' training status from the authors' viewpoints.

3.1. Qualifications of Contestants

Among the four types of works, there is no significant quantitative difference between undergraduate and postgraduate students. The difference between them is under 10%. But, from table 2, we can see that postgraduates create 5.7% more micro videos than undergraduates. Postgraduate

students do not show much superiority in any types of works development than undergraduate student. Development of courseware, VR games, and other instruction systems may take longer time. A long-term develop & research plan is another challenge for teachers and students to carry out the

whole develop & research job. One more step, empirical research is just in the beginning stage in the fields of educational technology in China. Educational software system development and project solution design are not very popular in most postgraduate students.

Table 2. Works from undergraduate and postgraduate students of educational technology.

Work types	Quantity	Postgraduate		Undergraduate		Percent Difference
		Quantity	Percent	Quantity	Percent	
Knowledge resources	174	41	71.9%	92	66.2%	5.7%
Supporting tools	51	10	17.5%	34	24.5%	-7.0%
Software system	12	4	7.0%	7	5.0%	2.0%
Project solution	10	2	3.5%	6	4.3%	0.8%
Total	196	57	100%	139	100%	

3.2. Work Types

Among the count of preliminary works, final works, and educational technology works, the number of knowledge resources dominate, followed by supporting tools, software systems, and project solutions. Knowledge resources account for about 70%, supporting tools account for about 20%, and software systems and project solutions each account for about 5% (For more details, see table 1). The high imbalance of the proportion among the four types of works can be explained as following.

Firstly, micro-course, micro-video, MOOC are warmly welcomed in classes recently, anyone with a mobile phone or any other mobile devices could connect to Internet and open the browser to watch a video clip to get the knowledge he wants to know [7]. And students are more easily getting involved in the live videos. Besides, video shooting and editing are very accessible today. Everyone could become a micro-video producer.

Secondly, educational app, interactive courseware, teaching games, micro-world games and other such small software tools aim at supporting single or group knowledge points. The development of such works requires both instruction theory and programming technology support. Such works are comprehensive and technically more difficult, but they are feasible for most educational technology students to accomplish.

Thirdly, the works amounts of software systems and project solutions are extremely low. It implies that there are some problems unnoticed in educational technology curriculums and students training process. Most of the educational technology students may not be competent to apply for high technology jobs when they graduate from school, like programming, AI, big data. The two points below should be kept in mind for the training of educational technology students.

(1) These two types of works are more comprehensive than the two above. First, the work should be a solution, products, teaching cases or teaching software, aiming to solve a typical

problem in ICT education. Accomplishing such a work, it needs the compound use of teaching & learning theories, instruction design methods, programming & database technologies and so on [8]. It's too complicate for most educational technology student.

(2) Students' practice opportunities and practice tasks are insufficient. Simulated practice tasks take the place of authentic tasks. Most of the students lack the chance of taking part in real course design and educational software development, especially those with database and network supported system platforms. Students may feel incompetent to accomplish a software system or a project solution. More practice mechanism should be established to get more authentic practice opportunities, multi kinds of practice bases, including basic educational schools, education and training corporations, software development corporations. In this way, educational technology students can contact with authentic teaching problems and do some authentic practice tasks [9] [10].

3.3. Work Target Users and Topics

Work target users and topics reflect students' understanding of educational technologies applied in teaching and learning, the focuses of ICT in education, and the abilities to use ICT to solve educational information technology problems. Table 3 shows the works target users and topics.

The number of works for K12 students is the biggest, accounting for 43.4% of the total; followed by the works for educational technology students, accounting for 31.1%; social public works like Chinese culture and political propaganda, common life, popular science and other works, accounting for 12.8%. It is encouraging that 4.1% of the works are online teaching systems, course learning platforms, and resources sharing platforms. These works stand for the leading theory and technology of educational technology students. Table 3 gives out more detailed information on contest works target users and topics.

Table 3. Work target users and topics.

Target users	Quantity	Percent	Topic of works and description
Young children	3		Filial piety culture, somatosensory games, puzzle games, in the form of App, Flash, etc.
Primary school students	45		Chinese, Math, Science, Information Technology, Morality and Society, in the form of micro-video, micro-courses, courseware, App, educational games.
K12 students	19	43.4%	Math, Chemistry, Geography, Physics, History, Biology, English, Information Technology, in the form of micro-video, micro-courses and courseware.
Junior high school students	15		Biology, Chinese, Physics, Chemistry, Information Technology, Geography, in the form of micro-video, interactive courseware and teaching package.
High school students	3		Can Fly English App introduction, computer hardware introduction, Hailam first aid method, in the form of Flash, App and micro video.
Ordinary students	61	31.1%	Courses on media art, computer technology, information technology, in the form of micro-video, courseware, and online courses.
Educational technology	25	12.8%	Introduction of Chinese culture, politics and world affairs, description of common sense of life, popularization of popular science, popular art teaching, etc., in the form of micro video.
Social public	8	4.1%	Online teaching system, online testing platform, resource sharing platform.
General teachers and students	4	2.0%	College students' psychological stress, campus loan, employment common sense, and simple materialistic view of nature, in the form of micro-video, static online courses, and courseware.
College students	2	1.0%	Computer assembly and computer network, Chinese food culture, in the form of App
Vocational school students	2	1.0%	Courseware for Children's learning Dahan language , Tibetan learning and teaching system (including website, App, WeChat public).
Minority nationality	2	1.0%	A pointing & reading and teaching system combined with software and hardware for blind people, a learning app for autism children rehabilitation.
Disabled children	2	1.0%	micro video of introduction to research software, micro video of introduction to blockchain.
Researchers	1	0.5%	Make interesting learning, use educational technology to improve the learning experience, and provide a one-stop solution.
Training institutions	1	0.5%	Hiragana learning lecture hall, micro video.
Japanese learning	1	0.5%	App courseware, Unity 3D-based interactive mechanical operation training.
Mechanical operation	1	0.5%	MIS system, exhibition hall reservation management system.
Teachers	1	0.5%	Micro-language training public number, providing a resource integration platform for the training of future teacher.
Normal students	196	100%	
Total			

3.3.1. Works for Public

There are 25 works for social public, which are mainly in the form of micro-video, series of micro-video, App, and PowerPoint presentations (See table 3). These works' topics include Chinese culture, popular science, popular art, politics and world affairs, like Chinese Hanfu, Chinese classical opera, environment protection, why the leaves will turn yellow, daily photography skills, introduction of the Silk Road, the Belt and Road, the eight basic obligations of party members and so on. On one hand, these works reflect the popularization of educational technology in people's daily life; on the other hand, they also reflect the students' concern for social culture, politics and social affairs.

3.3.2. Works for K12 Students

In addition to ICT and science education, Math, Chinese, Chemistry, and Biophysics are the favorite topic sources for the contestants (see table 4 for details). The reason is that college entrance examination left a deep impression in contestants' mind, and they still have strong interest in these subjects. They may integrate optimized ideas, teaching methods and techniques into the works.

Table 4. Works for K12 students.

Subject	Quantity	Percent
Maths	19	22.1%
Chinese	14	19.2%
Science	12	13.5%
Information Technology	7	4.8%

Subject	Quantity	Percent
Chemistry	6	6.7%
Biology	6	6.7%
Physics	5	5.8%
Geography	5	4.8%
English	4	3.8%
Comprehensive Course	4	3.8%
Security	1	1.0%
History	1	1.0%
Morality and Society	1	1.0%
Total	85	100%

3.3.3. Works for Educational Technology Students

Table 5 is the statistics of the works for educational technology students. These works are characterized by teaching professional courses and knowledge points. However, as to the instruction design of the selected topics, the works need more consideration on the teaching methods, media choosing, realistic feasibility, and other practical problems. Another phenomenon should be noticed is that most of these works are just remaining on the level of introducing a concept or re-representing a knowledge point in other distribution types, such as *How to Transform a Table, Light and Illumination, Grasp While Statement in 10-Minute*, etc. Meanwhile, there are also works expressing a knowledge unit as the topic, such as WeChat applet for Java *Web Programming*, micro-class for *TCP/IP Protocol*, as well as some complex works for a course, such as *Digital Photography Essentials*, series of animations and videos for *C Programming*, etc.

Table 5. Works for educational technology students.

Topic	Quantity	Percent	Description
Art of media	24	39.3%	Introduction to film and television technology, techniques and tools
Art of computer	14	23.0%	Introduction to C, Java, database, data structure, web page creation, network basis, AR, etc.
ICT course teaching	11	18.0%	Introduction to technology, concept and software in the information technology course of primary and secondary schools
Educational theoretical basis	8	13.1%	Using video to introduce the history of educational technology development, the composition of educational i leading institutions, mind maps, SPSS, innovative thinking and other basic theories and tools
ICT environment	2	3.3%	Introduction to electronic whiteboard, human-computer interactive device, micro video
Network based application system	2	3.3%	Online peer evaluation system based on group awareness, future classroom perception platform.
Total	61	100%	

3.4. Distribution Types

Table 6 is the distribution type statistics and work topics. From these data, the following points should be noted. (1) Video works accounted for 64.3%, close to 68.9% of knowledge works. Among them, single video files accounted for 79.4%. Videos are the first selection by contestants. (2) New technologies such as virtual reality, augmented reality,

learning community, WeChat public account, WeChat applet, etc. have been preliminarily used in the works. (3) There are some novel work topics, like *Pointing & Reading system for blind people's accessible learning*, *future classroom perception platform*, *online teaching system*. These topics aim at specific requirements from ICT integrated education to design corresponding solutions.

Table 6. Distribution types and topic descriptions.

Distribution types	Description	Quantity	Percent
Micro video	Single micro video, especially those to express one knowledge point or a social affair	100	
Micro video (series)	Series micro videos created to express or teach one course	15	
Micro video (including instructional plan)	Micro video with instructional design.	10	64.3%
Micro video (including teaching resource package)	Comprehensive teaching resources for teaching plans, courseware, micro-videos, exercises, and auxiliary materials.	1	
Courseware	Teaching courseware and popular culture courseware integrated with platforms like Flash, PowerPoint, and Story Line.	23	11.7%
App	Android app with specific themes of learning and teaching.	10	
App (virtual reality)	Using VR technology to show the relationship between the <i>shape</i> and <i>body</i> of hieroglyphics.	1	6.1%
App (augmented reality)	<i>Components of computer hardware</i> courseware based on AR Technology.	1	
Serious games	Serious games with topics from children, primary school Chinese, Math, security, etc.	8	4.1%
Online courses	Static online courses, topics including computer hardware, photography, employment interview skills, micro-language training, Java Web development, etc.	7	3.6%
Online teaching system	See detailed information in table 7.	7	3.6%
Courseware (interaction)	Virtual reality technology, auxin discovery process, 24 solar terms, PS tone processing.	4	2.6%
Courseware (serious game)	Minority language learning for young children of Daur	1	
Course program	Wonder robot training course incorporating STEM theory, new media literacy course for college students.	3	1.5%
Animation (Flash)	The Filial Piety Culture of the Disciples.	1	
Animation (PPT)	<i>Once Slow</i> , a poetry PPT animation.	1	1%
MIS management system	Exhibition hall visit booking & reception management information system.	1	0.5%
Future classroom perception platform	Real-time student identification & positioning, learning interaction between teachers and students in the city using iBeacon technology, including three parts: App, PC client and web service.	1	0.5%
Pointing & reading system for blind people's accessible learning	Braille course teaching system combining software and hardware as a whole.	1	0.5%
Total		196	100%

Table 7 shows more topic descriptions, system functions, technical information about the online teaching system works. These topics are highly focusing and their technical features are distinctive. Meanwhile, ICT technologies are accurately used to solve the theoretical issues in online teaching. (1) Theoretically, the system design backs on teaching theories, like learning science, formal and informal learning, virtual learning community, collaborative learning, independent practice, learning feedback [11]; (2) Technically, cloud

computing, data analysis, online Q&A, intelligent evaluation and big data technologies have been applied; (3) As to developing tools, Linux, Hadoop, Map/Reduce and other new tools are used; (4) Software engineering tools have been applied in the development of these works, such as Axure and TeamViewer. All of this show that educational technology students are ready to accept up-to-date theories and technologies and to apply them in educational software development, and they have the experience to use software

engineering tools to help them in completing complicate software projects.

Table 7. Online teaching system works and their topics.

Work name	Platform & tools	Function description
Xiaofeilong translation	Android Studio	Tibetan-Chinese translation learning system, which has the following functions: Tibetan-Chinese translation, basic learning and exchange forum for Tibetan; in the form of website, APP and WeChat public number.
Database Online Teaching Platform	MySQL; JQuery; PHP; Apache	Database self-learning platform, whose functions include: homework feedback, smart recommendation exercises, self-training.
Online peer evaluation system based on group awareness	Eclipse; Etherpad; Maven; Tomcat	Group learning platform, visual group perception map, real-time online text editing, peer review.
CCBS palm-campus cloud platform	CentOS; Office; TeamViewer; Android	Including eight functional modules such as online learning, online discussion, activity implementation, online question and answer, examination test, teaching process organization management, system management, and cloud data analysis.
Answer Pai	Hadoop; MySQL; Map/Reduce; Java	Online question and answering system, big data, data analysis technology are used.
Yin tu Into (prototype)	Axure	In order to enhance the sense of control and belonging when learning online, a prototype of online teaching platform based on community and individual learning space was designed.
iSpace (prototype)	Axure	The prototype introduces the concepts of individual learning space and learning community to achieve students' individualized learning goals through the integration of formal learning and informal learning.

3.5. Authoring Tools

In the process of developing contest works, there are 84 kinds of software in total. They could be divided into 11 major categories. The names and frequency of the software used are shown in Table 8.

Media authoring tools for audio, video, image accounts for the vast majority, followed by programming, animation, and other related software. In addition to big data theory and technology, (1) virtual reality and augmented reality technology represented by Unity3D are becoming more and

more popular; (2) collaboration and shared collaboration are becoming more normal. Online collaborative editing and sharing software such as Equil Note and Etherpad provide new text authoring environments for multi-user synchronous teaching and learning; (3) interesting programming tools like Scratch are welcomed by students; (4) Authorware and some other software are too old, and there no update service under updated OS; (5) Finally, Axure prototype is still in the theoretical design stage and there are still a lot of development tasks to be done to finish the final software system.

Table 8. Classification and use frequency of authoring tools.

Type of software	Related Works	Software Used	Software name/used frequency
1 Video processing	169	16	Premiere/71; After Effects/38; Camtasia/29; Edius/9; Vegas/3;...
2 Multimedia integration	156	11	Flash/53; PowerPoint/51; Focusky/18; Wancai Animation Master/15; Storyline/9; Authorware/4;...
3 Programming tools	36	15	Android/9; Android Studio/4; Eclipse/4; PHP/3; Scratch/3; C#/2; Visual Studio/2; WeChat API/2; Dreamweaver/1; Java/1; JQuery/1; Maven/1; MVC/1; Eclipse/1; Web Storm/1
4 Image processing	33	4	Photoshop/30; Corel Draw/1; Inkscape/1; iStudio/1
5 Animation making	32	11	3DMax/10; Animate/4; Sketchup/4; Video Scribe/3; Shadow player/2; Easy Sketch/2; Cinema4D/1; Lumion/1; Maya/1; Mageda/1; 8 times panoramic roamer/1
6 Office Software	26	6	Office/21; Word/1; WPS/1; Equilnote/1; Etherpad/1; Excel/1
7 Audio processing	21	3	Audition/19; GoldWave/1; Expert in changing voice/1
8 System environment	18	13	Operation system: CentOS/1; iOS/1; Windows7/1; WindowsXP/1; Big data: Hadoop/1; Map/Reduce/1; Database: MySql/4; SQLite/1; Apache/3; Tomcat/1; iBeacon/1; TeamViewer/1
9 Virtual reality	9	3	Unity3D/6; NoBook/2; zSPACE/1
10 Prototype development	2	1	Axure/2
11 Game development	1	1	RPG Maker MV/1

4. Expert Reviews

After the live finals, we interviewed the contest judges. The interview contents included the organization and management of the contest, the quality control of the contest works, and the quality improving suggestion for the follow-up contests. The judges approved the highlights of the iTeach works, like widely selected topics, creatively applied new technologies. They also pointed out that students need more theoretical

instructions and detailed technology guidance in completing their contest works. Besides, the judges gave some advices for educational technology students training. Firstly, theory learning and application still should be kept in mind when contest students are designing contest works. Secondly, programming, database technology, big data, education intelligence should be enhanced for most undergraduate and graduate students.

4.1. Features of Contest Works Are Distinctive

Firstly, work target users' requirements are analyzed accurately. Such contest works include Pointing & reading system for blind people's accessible learning, Courseware for children learning minority language Daur, Future classroom perception platform, ICT supported enterprise training solution, STEM theory Guided Wonder robot training course and such like contest. These works aim to solve education informationization requirements of specific group of people, in specific environments, and guided by specific educational instruction theory.

Secondly, new technologies and theories are properly applied. Educational big data, virtual reality, and augmented reality have been used in the contest works. For example, Pictogram AR of plum, orchid, bamboo and chrysanthemum uses augmented reality modeling technology to visually interpret the relationship between the shape and body of hieroglyphics. AR Puzzle Playmates is a virtual and realistic puzzle app with variety of interactive puzzle games. The works in Table 7 integrate big data, data analysis technology, learning science theory all together.

Thirdly, work topics show more characteristics of the times. The topics include national culture, popular innovation, national politics, economy, like One Belt, One Road, Standards for Being a Good Student and Child, Chinese Hanfu, and etc. From these topics, it can be seen that educational technology students are keeping up with the development of the times and they are caring about latest social affairs and politics. They are readily to accept new ideas and variety cultures.

4.2. Advices for Follow-up Contests

The contest judges also pointed out some general problems in the works that should be concerned, such as lacks of instructional design, ICT integration skills, and contestants' problem-solving abilities.

First of all, most of the contest judges questioned the instructional design of the knowledge resources and supporting tools works. These works lack in-depth instructional design, and the students have little practical instructional design experience in the works. They had little prior investigation and research on the work topics before they started to prepare the contest works. Only when they get thorough understanding of the topics and similar topic works design ideas, can they figure out a new and creative solution to avoid simple resource re-building and re-development.

Secondly, there is a lack of theoretical guidance in the design and development process. Perceptual elements take the place of rational design. For example, for some educational games, contest students mechanically applied the concepts of serious game, like game score, game levels and game story, but they did not relate game story telling with knowledge points, and the games levels did not have obvious relationship with students' accomplishments.

Thirdly, hard technologies are overlooked. Students tend to develop works using soft technology. (1) There are far more

knowledge resources works than other type of works. One single micro-video works are more than series of micro-video, micro-class and other systematic works. (2) There are few hardware design related works. Among the 196 works, only two works involve hardware design. (3) The number of software system works is also very small.

In addition, in the process of selecting topics, designing and developing works, more than half contest students choose easier developing tools (See Table 8). From the distribution type of works, video works and single-form courseware account for more than half of the courseware, the contest works authoring tools mainly involve image, audio and video processing and editing. Why do so many students choose these distribution type of works? The reason is that there are no quantitative indexes to evaluate the contest works. Many students may think it's easy to finish such micro-video works. However, software system development is completely different. Once stuck in a programming statement will directly lead to an uncompleted work, not to say many other program logics, software environment configurations, hardware architectures.

Finally, novel design is not accordance with the instruction design. The works interfaces are gorgeous, but the actual educational problems are not solved. Gorgeous and advanced technology are used in works interface design, but little breakthroughs are done in instruction design and learners' problem solving. Learners' learning obstacles and thinking confusion are key points in contest work design, like abstractive concept visualization and tacit knowledge visualization.

5. Suggestions for Educational Technology Student Training

5.1. Curriculum Structure Rethinking and Adjustment

From *Audio-Visual Education* to *Educational technology*, great changes have taken place in educational technology major curriculums [2]. Many new courses are appearing, like *Learning Science*, *Mobile Learning Resource Development*, *Big data in Education*, *Robot and STEM Education*. Meanwhile, some courses are canceled, such as *Electroacoustic Technology*, *Educational technology Equipment*, *Analog Circuit*, *Digital Circuit*, etc. An already happened trouble is that some schools and businesses are complaining that some educational technology graduates are not qualified to use ICT equipped classrooms, or to maintain ICT equipment, not to say planning a ICT solution. With the development of Big Data, Block Chain, AI, educational students' lack of general science, electronic circuit, programming, database are becoming prominent. Once they graduate from universities, they cannot get along well with the courses about robot, STEM, programming, and such ICT courses. It's urgent to adjust educational technology curriculums to meet the requirements from schools and businesses.

5.2. Course Quality Enforcement

Quality concerns the whole spectrum of context, partners, people, methods and stages of the course. First, a quality assurance list should be established by CETTC, like commonly acceptable principles, procedures and guidelines for QA. For the purpose of the execution and assessment of the list, a suitable system of assessment to be deployed by various agencies for internal and external assessment [12]. Second, the list should also give some advices on various ICT integrated teaching methods like inquiry teaching, problem-based learning, hybrid teaching & learning, team based learning, and so on. Last, students, fellow teachers, and third part quality assurance organizations can all involve the quality assurance activities.

5.3. Course Resources Building

Course resources are main sources for students get to know about the relationship between the courses and real world. The timeliness and authenticity of the resources affects students' understanding the courses' objectives and requirements [13]. Former grade students' work examples speak more about the courses and the course work requirements, and are more helpful for new students to accomplish the course. The course resources could be in various forms, like instruction products, courseware, videos, Apps, software system, software design report, curriculum plan, and so on. Rich course resources can provide different students diverse learning methods, and can give students multi alternations according to their own learning styles.

5.4. Practice Teaching System Integration

In recent years, students' innovation ability training programs have been carried out in colleges and universities in various forms, such as project interest groups, in-course experiments, iTeach and other contests, holiday practice, graduation practices, and so on. To integrate these practice resources with students' training, and to form a practice teaching mechanism is good for deeper integration of courses, contest, employment, and further studies [14-15]. The span of the practice activities can be designed to cover students' whole college life.

5.5. Science Research Feeding Back Teaching

For students, frontier topics and authentic projects are more inspiring than text books [16]. Incorporating these latest authentic materials into courses with similar topics and techniques is helpful for student development. Firstly, graduate students research task could be scheduled into several parts, then graduate students and undergraduate students undertake different parts of the whole task. In this way, supervisor, graduate students, and undergraduates form a research group to learn and work together .

6. Conclusion

iTeach contest is a national college student contest

sponsored by the China Educational Technology Teaching Council. Its significance is to expand the educational technology professional practice mechanism and to provide a platform for students of educational technology to show themselves, so as to stimulate them to take part in more practices. This article carried out qualitative analysis from the aspects of player qualifications, types of work, topics selection, distribution types, creation tools, etc., then analyzed these works in combination with interviewed experts' opinions. Last, the article put forward some suggestions for the training of educational technology students in five aspects, including the curriculum structure, curriculum resources, curriculum quality assurance, practice teaching mechanism, research and feedback, and so on. We hope it will benefit the follow-up contest and the training of educational technology students.

The statistical analysis of this article is limited to 196 works participating in the on-site defense, and there may be some omissions. It needs further systematized in terms of statistical caliber and dimension. Considering the long-term development of the iTeach contest, the following business should be done: (1) to establish a standardized database of contest works, and gradually to form a standardized analysis process and indicator system; (2) to form a work analysis software management system [17], tracking each round contest's works and conduct quantitative and qualitative analysis of the works data, thus forming standardized statistical analysis reports; (3) to establish a display and sharing platform for excellent works for open access, so as to create a shared culture of iTeach contest.

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