ICT Competency Framework and Investigation of Teachers' ICT Competence on Tertiery Level*

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Abstract - This paper intends to construct a competency framework for college English teachers in universities of China on the review of literature on this topic home and abroad. The author mentions the necessity of setting up an ICT competency standard and proposes an ICT competency framework; on the basis of the framework a questionnaire survey was conducted to investigate college English teachers' ICT competence, then suggestions are put forward on teacher training.

Index Terms - ICT, Competency, Framework, College English Teaching, training

I. Introduction

In 1980s there was a "standard movement, many countries devoted themselves to researches on standards to ensure the quality of teaching and learning. In the 21st century more and more countries are engaged in setting up standards to give norms to teaching. Teaching has been taken as a profession and it is believed that the quality and outcome of education is largely attributed to the quality of teaching [1, 2]. So it is necessary to develop the competency standards for teachers so that teachers may take teaching as their professional and according to the competency standard they can find out their insufficiency in teaching and improve while conforming to it.

Many researchers have conducted researches on the framework and descriptors for the competency of teachers on all the levels of education [3]. They hold the view that information and communication competency is the indispensible component of teacher competence because in the information society, it is an inevitable trend for teachers to have their information literacy [4]. As Lu mentions, in the recent 30 years Chinese researchers have been engaged in introducing the competence standards for teachers from abroad, they seldom focus on the detailed description of teacher competence on the tertiary level [5], not to mention the description of ICT competency for college English teachers.

The author of this paper intends to construct a framework to describe college English teachers' ICT competence and conduct a survey on their competence in the real world teaching, thus put forward suggestions on teacher training.

II. Significance of ICT Competency

A. Significance of ICT in Educational Reform

There is emerging broad consensus worldwide about the benefits that can be brought to school education through the appropriate use of evolving information and communication technologies. With the development of ICT, teaching beliefs, teaching modes and learning modes are continuously changing. The teaching content becomes not only richer, but also more direct and vivid in form. It is possible for learners to conduct more individualized, autonomous learning with the help of multimedia and networking [4]. The range of possible benefits of using ICT covers practically all areas of teaching and learning activities, from improved teaching and learning process to better student outcomes, from increased student engagement in classroom to effective communication in and outside school.

Experts in education believe that ICT will surely lead to the great educational reform in which learners should be enabled not only to acquire an in-depth knowledge of their school subjects but also to understand how they themselves can generate new knowledge, using ICT as a tool [6]. As is also reflected in the new Curriculum issued by the Ministry of Education in China, "emphasis should be attached to the cross-disciplinary learning and the application of modern technology to ensure that learning efficiency will be raised and learners are qualified for the information society"[5].

To achieve the above educational objectives, firstly teachers should be competent in the knowledge and application of ICT. In 2004, the Ministry of Education stipulated *the Educational Technology Competence Standards for Primary and Secondary School Teachers*, which provides criteria for primary and secondary schools teachers to evaluate their own ICT competency, a guideline for schools to improve their staff's ICT competency.

B. Significance of ICT Competency for College English Teachers

Though there is no ICT competency standard for teachers at tertiary level yet, researches begin to be initiated in this field. Lively discussions were conducted in the indispensable nature of ICT competency in the framework of teacher competence [7].

In 2004 the Ministry of Education issued *College English Curriculum Requirements* (*Requirements* hereafter), which calls on college teachers to introduce "new teaching models with the help of multimedia and network technology" instead of "the existing unitary teacher-cantered pattern of language teaching". In response to this requirement, many teachers and researchers began to probe into the multimedia and network-assisted teaching. ICT competence gradually becomes college English teachers' concerns. It is generally believed that with the help of information technology, both the English teaching

and learning efficiency can be improved. Thus it is vital for college English teachers to grasp the new concepts, knowledge, skills in the ICT field and combine them in their teaching. Wang says that to some extent college English teachers' ICT competence decides the learning outcome; the lack of ICT competence becomes the bottleneck of the effectiveness of college English education [8].

III. Framework of ICT Competency

Now it comes to the description of ICT competency. In 2000 U.S. issued its *National Educational Technology Standards for Teachers* established by the International society for Technology in Education (ISTE)[9], which can be applied to all teachers in US. As mentioned above, In China, the Ministry of Education stipulated *the Educational Technology Competence Standards for Primary and Secondary School Teachers.* In 2008, UNESCO issued *UNESCO ICT Competency Framework for Teachers* for the purpose of helping countries to develop their own ICT competency framework and standards [6]. Besides, some other researchers have also proposed some frameworks on college teachers' ICT competency. These all shed some light on the present ICT competency framework for college English teachers.

A. ICT Competency Framework outside China

US *National Educational Technology Standards for Teachers* require teachers to be proficient in the six categories of competencies: technology operations and concepts; planning and designing learning environments and experiences; teaching, learning and the curriculum; assessment and evaluation; productivity and professional practice; social, ethical, legal and human issues. This framework was composed on the basis of the National Technology Standards for Students. It actually is a learner-centered one. Teachers should be helpful to their students in all the learning processes from mastering the technical concepts to learning to be ethical while using ICT.

UNESCO *ICT Competency Framework for Teachers* is more general because it serves as an international benchmark which sets out the competencies required to teach effectively with ICT. It emphasizes that it is not enough for teachers to have ICT competencies; they also need to help learners to be collaborative, problem-solving, and creative through using ICT. The framework thus addressed all aspects of a teacher's work: understanding ICT in education, curriculum and assessment, pedagogy, ICT, organization and administration, and teacher professional learning. Besides the six aspects, this competency framework is also a hierarchy one, which provides three stages of teacher development: technology literacy, knowledge deepening and knowledge creation.

When compared, these two all take a learner centered approach, describing teachers' competency from the perspective of the role a teacher can play in developing learners' ICT competency covering the whole teaching process. It's worth mentioning that UNECO framework takes teachers' professional development into consideration, describing the three stages of development into account, which makes it more dynamic.

B. Framework Proposed by Chinese Researchers

In China, the *Educational Technology Competence Standards for Primary and Secondary School Teachers* serves as the criteria for training and evaluation of teachers in primary and secondary schools. It describes ICT competency from four aspects: awareness and attitude, knowledge and skill, application and creation, social responsibility. Though it has only four categories, it also covers the roles teachers play in the whole teaching process. Different to the other two frameworks mentioned above, it emphasizes teachers' competency in doing research while using ICT, either individually or in collaboration with others. This official document is quite influential on other Chinese researchers when discussing college teachers' ICT competency.

On the basis of teacher investigation, Zhang proposed an ICT framework which includes four aspects and ten categories [10]. The four aspects are: tools and application; resources and management; teaching and design; performance and development. The first aspect includes two categories, namely knowledge and skill of multimedia and networking, the operation and application of hardware and software. The second aspect includes three categories: knowing how to get appropriate resources; the management of the resources, and more professional attainment with ICT. The third aspect includes teaching approach design; ICT resources developing and making use of ICT in teaching practices. The fourth aspect includes two categories: the reflection and evaluation of teaching and learning; lifelong learning.

On the review of domestic researches of ICT competency, Xu put forward his framework, which includes four categories of competencies: Ideology; theory, skills and information literacy [11]. The first aspect means that college teachers should be aware of the importance of ICT, and be willing to use them in practices. The second means teachers should lay a solid foundation in ICT theories. The third means that teachers should be skillful in using hardware, software and modern communication tools. The fourth category requires college teachers to guide learners to judge and process online information appropriately.

The above two frameworks have something in common. They both take teachers' skills in using ICT as a main competency for college teachers. What is different is the former focused on the teaching process, while the latter is mainly from the aspect of teacher development.

C. The present ICT Competency Framework

The above frameworks shed some light on the present framework the author proposes. First, it's sensible to adopt a learner-centered approach, because though teachers play an important role in achieving the educational outcome, learners are those who really decide, especially in English teaching and learning environment because learners need to practice more in order to develop their communicative ability. Second, we need to take teachers' development into consideration and regard ICT competency from a developmental perspective. Learning is a lifelong process and an ICT technology is evolving all the time, so ICT competency standard should have several stages for teachers to work for.

Based on the constructivism theory, college English teachers can serve different roles in the language teaching

process, the present research categorize the ICT competence into the following seven categories: designer of learning activities, manager of learning process, evaluator of learning outcome, master of ICT knowledge and skills, advisor of learning problems, researcher of learning effectiveness, and lifelong learner.
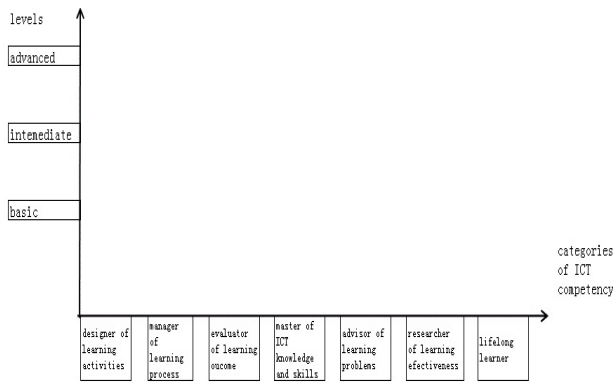

Figure 1 Framework for ICT Competence

If an ICT competency standard is developed based on the present framework, it would be like a coordinate axis, the competency is on the horizontal axis, the levels are on the vertical one, as is shown in figure1. For each category of competency, there are three levels: basic, intermediate and advanced. Qualified college English teachers should at least achieve the basic level of ICT competency. Then there would be 21 modules of competency description. In each module, detailed "can do" statements can be developed to describe the behavior a qualified teacher should have on the level. For example, in the module of "basic designer of learning activities", college English teacher's ICT competency can be described as "can find suitable digital English material for students to read", or "can organize group discussions online in English via networking", etc.

IV. Survey on College English Teachers' ICT Competence

In order to know college English teachers' ICT competence and proposes appropriate suggestions on training, the researcher conducted a questionnaire survey on the present ICT competence categories. Some researchers have conducted survey among teachers [12]; the present one is a learner-centered one and takes college students as participants.

A. Instrument

There are two parts in the questionnaire. The first part asks the participants to describe their English teacher in the classroom assisted by computer and network metaphorically. The second part consists of 12 questions on their impression of English teachers' ICT competence in activity designing, learning process management, outcome evaluation, mastery of ICT knowledge of skills, and their capability in solving problems. For this is a survey conducted among learners, thus "the researcher of learning effectiveness" category and "the lifelong learner" category was not mentioned in this survey.

All the items are based on the informal interview with English learners.

B. Participants

The participants of this survey are 240 college students. All of them have studied English for two years in college, and they have joined the English classes assisted by computers and networks for at least four terms. 144 of them are females, and 96 are males.

C. Procedures

The questionnaire was handed out in one of the English classes. Participants were asked to fill in the questionnaire in 20 minutes. The response rate is 100%.

D. Results and Discussions

Percentage of responses was counted. In the first part, the researcher intends to know learners' general impression of college English teachers ICT competence. Participants were asked to describe their college English teacher with a metaphor; there was no definite answer to this question. The researcher categorizes their answers into several categories, as is shown in table 1:

Table 1: learners' impression of English teachers in the classroom supported by ICT

metaphors	Categories	percentage	impression
Mum, dear aunts, elder person	relatives	11.1%	positive
Easy going friends	friends	5.5%	positive
Flower, mother chicken, the moon, the sun	nature	13.9%	positive
A piece of cloud, a gust of wind	nature	5.5%	negative
Technical director, monitor in the exam, internet bar assistant, wild animal trainer, priest, gatekeeper	Other jobs	38.8%	negative
Stranger, wicked woman	Other image	8.3%	negative
God, goodness	Other image	5.5%	neutral
Navigation light	articles	2.7%	positive

From table 1 we can see that positive metaphors indicate learners are quite satisfied with their teacher's assistance in the ICT assisted language learning environment, while the negative metaphors show that English teachers did not exert their role properly in the learning process. They are like a gust of wind because there is not enough communication between the teacher and learners. Teachers were regarded as "gatekeeper, wild animal trainer, internet bar assistant" because they did not give learners enough guidance in choosing learning material, nor design interesting learning activities.

As to college English teachers' role as designer of learning activities, there are 3 items on it. 78.7% of the participants did not like the present activities, such as

translation in class; 67.9% think that their teachers can design some group activity which help them to learn something; and only 36.8% of the participants believe that their teachers know their potentials when design learning activities.

As to college English teachers' competence of being a manager of learning process, there are also 3 questions. Only 44.4% of the students think their teacher could teach according to their needs; 48.1% of the participants think their teachers could arouse their interests in learning English; and 66% of the students think that they can cultivate their mind through the material provided by their teachers.

When it comes to teacher's competence of being an evaluator of learning outcome, there are 2 questions for learners to respond to. Only 26% of the participants agree that their teachers can evaluate their learning outcome objectively. 55.8% of the participants think that their teachers can evaluate their learning in more than one way.

When asked whether their English teacher can be the advisor when they face learning problems, only 33% of the participants think so; 41% feel that they did not get any help in learning strategies and approaches.

As far as their teachers' ICT knowledge and skills are concerned, 75% of the participants think their teachers can use computer and network well. But 90% of them think that their teachers are not skilful in designing courseware; they can't keep up with the new technologies.

V. Suggestions on Teacher Training

According to the above survey results, the researcher puts forward the following suggestions on teacher training.

A. Organize Forum for English Teachers to Keep up with the Student-centered Teaching Belief

College English teachers should first get familiar with the student-centered teaching belief. They not only need to know what, why, but also how to conduct student-centered English teaching with the help of information technology. Universities and colleges can organize forum on this subject, teachers can exchange idea with one another.

In the student-centered English teaching classroom, teachers need to design lively discussions, pair work, group work which would exert students' full potential and arouse their interest in learning English.

B. Build Teachers' Confidence in Using ICT in Courseware Design

As the survey shows that the majority of learners felt that their teachers can not design their courseware with ICT. This result coincides with that of Xu's research. Xu found that About the ICT knowledge of skills, the majority of the teachers in the survey are not familiar with the new concepts and teachers who have taught more than 15 years are less skillful in using ICT. 41% often use network resources, 73.6% of them have never tried developing courseware themselves [11].

English teachers know the language well and they are also familiar with the language acquisition theories. If they could combine their knowledge in language and language learning rules with ICT, they would design more useful courseware than those who are only skillful in ICT. It is important to build teachers' confidence in mastering ICT. A teacher's professional growth is in close association with the environmental support. Universities can provide English teachers with opportunities to communicate with ICT experts, courses to study the application of ICT can all be favorable conditions for college English teachers.

C. Increase Training on Learning Strategies and Evaluation Approach

The survey results showed that students need more guidance in learning strategies in the computer and network assisted English learning environment. College English teachers should be trained on learning strategies and developmental psychology so much so that they would know their students well and give them proper advice they meet with problems in the learning process.

In addition, since learners are not satisfied with teachers' evaluation of their learning outcome, teachers need to know how to measure their students' achievement in English appropriately. It may be sensible for universities to train English teachers on language testing theories and measures via specific courses or in the form of forums or regular meetings among English teachers. Only when learning outcome is properly measured, can learners find their progress and have stronger motivations to learn English well.

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