Research on Personalized English Learning and Teaching System Based on Mobile Devices and the Internet: A Case Study

ZHOU Yan[1, a]

[1]Gannan Normal University, Ganzhou 341000,China

[a]zhouyan@126.com

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Abstract. With the fast development of computer science and multimedia mobile devices based techniques, modern education with computer has been a state-of-the-art trend. The impact of the novel concept of multimedia network teaching methodology and mobile network are widely recognized and researched. The author has studied the use of the modern educational technology. Deepening understanding and optimizing the use of multimedia in class are proposed in the paper. Timely and appropriate utilization of modern educational technology under multimedia network environment is helpful and beneficial to the improvement of English teaching. Further work is proposed and analysed with experimental simulation result.

Introduction

At present, the network resources have gradually permeated in the English education and English teaching under network environment is becoming more and more distinct, which made a breakthrough on the space and time in teaching and learning. The technical conditions of interchange feedback and real-time interaction can be realized with the application of modern educational technology and multimedia network in teaching. Under the guidance of the Ministry of Education in China, many universities has been deepening English teaching reform in full swing and also have made gratifying achievements. English teaching has evolved from the traditional class of blackboard and chalk into the modern model of network teaching. [1] A big shift from static to dynamic brings vividness and real-time exchange into full play. . At any dialogue turn there are several training sentences that can be selected. The leaves of the last tree are linked to the root of the first tree, making the dialogue paths infinitely long. The goal of the policy is to select the training sentence at each dialogue turn based on the learning status of the learner, such that the learner's scores for all pronunciation units exceed a pre-defined threshold in a minimum number of turns. The framework is again defined as an MDP, but here the MDP is realized in a high-dimensional continuous state space for a more precise representation of the learning status considering every possible distribution of scores for all pronunciation units. Simulated learners with incrementally improved pronunciation scores generated from real learner data are used in policy training. As a result, it is of great significance and value to apply and optimize modern educational technology under multimedia network environment in English teaching. Modern education based on network technology is evolving from a backward pattern of learning and teaching to students' autonomous learning. Traditional education follows the paradigm in which learners read a passage from textbooks, listen to teachers' presentations, read again, take notes and then finish a test. The pattern is less efficient, expensive and has not integrated the potential that modern educational technology based on network technology can offer when it comes to the increase in students' learning interest and ability [2-5]. The existing modern educational technology can explain complex subjects by using multimedia presentations. The author has tested and developed a multimedia approach to explaining complex notions in English teaching, which shows a promising future in English learning and teaching. The author analyse the current situation of the utilization of modern educational technology in the first place, provided the theoretical bases for the application in the second place, elaborated on the teaching practice of the optimization network-based multimedia and

shared the insights in doing so in the paper. The following sections will discuss the issues more in-depth.

Our theoretical methodology

Concepts and Basic Principles. Major industry developments over the past few years have brought audio, video, and data-enhanced, real-time communications out from the realm of highly specialized applications. Multimedia communications have become part of the standard set of functions supported by the corporate network infrastructure. About two years ago, the deployment issues surrounding multimedia conferencing technology we described by market research firm Forward Concepts as the convergence of "price, performance, and plumbing." the following figure is the Interpretation of the concept. The following figure 1 shows the definition.

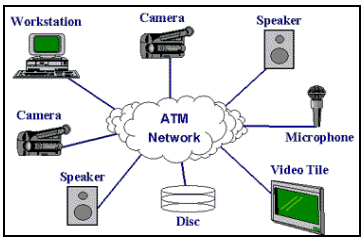

Figure 1: Interpretation of the Concept

The progress of the dialogue game is based on the script of a series of tree-structured sub-dialogues cascaded into a loop, with the last sub-dialogue linked to the first. In preliminary experiments, the whole dialogue set contains conversations between roles A and B — one the computer and the other the learner. After each utterance produced by one speaker, there are a number of choices for the other speaker's next sentence. Figure 2 shows the recursive structure of the script in the restaurant scenario. The whole dialogue starts with the phone invitation scenario, followed by restaurant reservation and so on, all the way to the last sub-dialogue of saying goodbye. After the last tree, the progress restarts at the first phone invitation sub-dialogue again for the next meal. Essentially, then, the dialogue can continue infinitely.

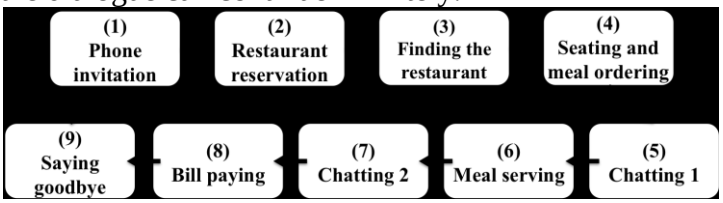

Figure 2: The Recursive Structure

The above recursive dialogue game is modeled by an MDP with the desired optimal policy trained with the FVI algorithm. A learner generation model is developed to generate simulated learners from real learner data to be used in the FVI algorithm. The overall system block diagram of the proposed framework is shown in Figure 3. Interaction between the learner and the system involves Utterance Input from the learner and Selected Sentences from the system. The Automatic Pronunciation Evaluator scores the performance of each pronunciation unit in the utterance.

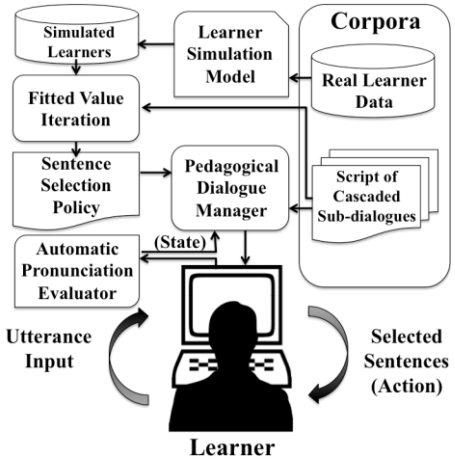

Figure 3: The System Block Diagram

These quantitative assessments are sent to the Pedagogical Dialogue Manager, which is driven by the Sentence Selection Policy for choosing the next sentence for the learner. A set of Real Learner Data is used to construct the Learner Simulation Model, which generates the Simulated Learners to train the Sentence Selection Policy based on the Script of Cascaded Sub-dialogues using the Fitted Value Iteration algorithm.

Data Collection and Interface with Network. The real learner data used in these experiments were collected in 2013 and 2013. In total there were 278 English learners at the selected university from different countries balanced gender pronouncing 30 sentences selected by language teachers It assigned scores from 0 to 100 to each pronunciation unit in every utterance of the real learner data. The scores of each utterance pronounced by a learner are used to construct a pronunciation score vector (PSV), whose dimensionality is the number of the pronunciation units considered. Every component of the PSV is the average score of the corresponding unit in the utterance; those units unseen in the utterance are viewed as missing data and solved by the expectation-maximization (EM) algorithm. The PSVs from all utterances produced by all real learners are used to train a Gaussian mixture model (GMM), here referred to as the Learner Simulation Model. This is shown in Figure 4. Since the goal of the dialogue is to provide proper sentences for each learner until their pronunciation performance for every unit reaches a pre-defined threshold, we need to develop an incremental pronunciation improvement model for the simulated learners.

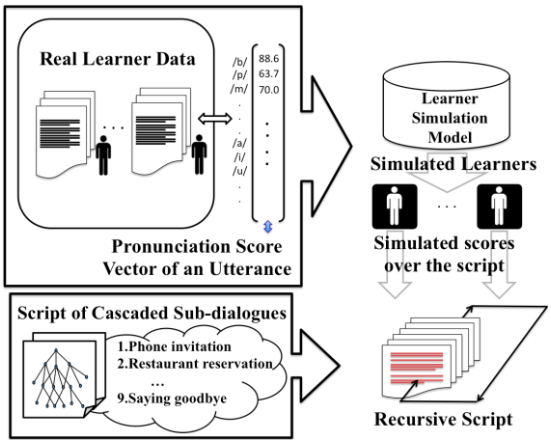

Figure 4: The Learner Simulation Model

The following A-D procedures discuss the problem in detail. A. Resource sharing. All kinds of Media information processing and function of human-computer interaction are available by means of modern educational technology. What's more, the online multimedia information resource sharing represents the up-to-date and inevitable trend of the application of multimedia network to teaching environment [6]. B. Interactive teaching. The two-way network information transmission renders interactive teaching possible. The publisher and the receiver of the network information can be the same identity. In the process of teaching practice, students receive the teaching information from and send their feedbacks back to the teachers through the network. Therefore, real-time

messages can be exchanged between teachers and students and teaching practice can be promoted. C. Personalized learning. It is up to students to choose when and where to study and how much they are going to get through by making use of network technology. At the same time, the result of the network resources sharing makes the learning not only individualized but also flexible [7]. The students' learning enthusiasm and creativity can be mobilized to the fullest extent. D. Timeliness assessing. The extent to which individuals receive necessary and timely assessment is one dimension of the process of network teaching. Timeliness can be viewed as the interaction between results of learning and teachers' review, both of which are expected to influence the effectiveness of learning process [8]. It is known to u all that implications of timeliness assessments for teaching and learning behavior are of great importance.

The experiment and simulation modelling

Contrast Between Traditional and Mobile Teaching. Traditional English teaching places strong emphasis on teachers' instruction. Consciously or unconsciously, a great many teachers dominate the whole class. As a result, the entertaining and scientific nature of textbooks is submerged and the enthusiasm and initiative of students are obliterated. At the same time, students have been trapped in a state of so-called "malnutrition" as a result of the lack in visual and audio materials [9]. So there is no doubt that modern educational technology under network environment will play a significant role in learning and teaching as well illustrated in figure 5.

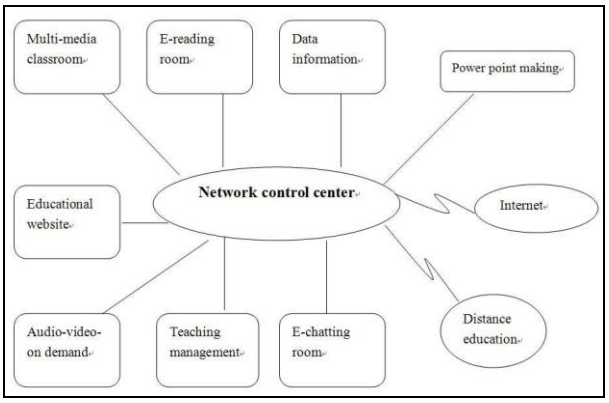

Figure 5: The Experimental Demonstration

Policy and learning status for an example learner. Figure 6 shows how the system offered practice opportunities for every pronunciation unit for an example testing simulated learner in the sub-dialogue trees four to five after finishing the first three trees (20 turns in all after tree three). In this case, there were K = 171 total dialogue turns. The horizontal axis is the Initial/Finals on the left and tone patterns on the right sorted by the average scores (left vertical scale) of this simulated learner (green bars). The red curve indicates the percentage of extra practice for each unit over those by random policy (right vertical scale) using the proposed policy, while the blue line is zero for random policy. Since the policy goal was for each pronunciation unit to be produced with score 75 over seven times, we focused on the units within two dark blue blocks, which have scores below 75. Clearly our proposed approach resulted in a greater number of practice opportunities than random policy on these units in 20 turns after tree three. This means the policy was efficient to provide what the simulated learner needed.

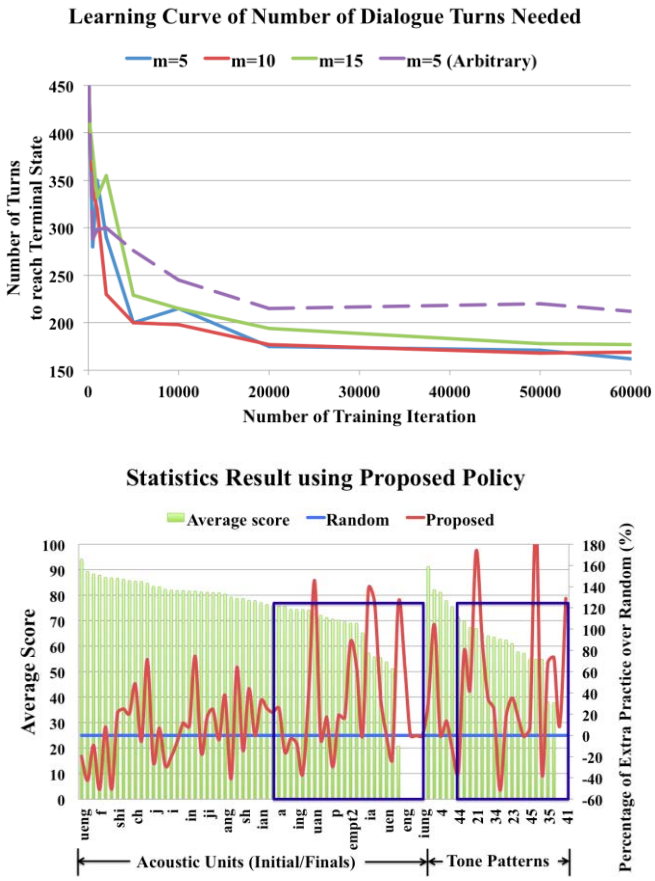

Figure 6: The Demo Experimental Result

Constructivism in English Teaching and Learning. Constructivism is an art of learning founded on the precondition that people cultivate their own understanding about the world they live in by looking back to their own experiences. People can generate their own "mental models" and "rules", which they employ to make sense of what they have experience. [9] Learning, therefore, is just the process of adapting the mental models to absorb new experiences. Constructivism, a further evolution of behaviorism and cognitive theory, offers great theoretical bases for application of network-based multimedia teaching. Constructivism is an opinion of learning based on the thought that knowledge is not something that can be just provided by the teacher in the front of the classroom to receivers at the desks. Rather, knowledge is built by learners through a vigorous, mental process of development, whereas learners are the constructors and creators of knowledge and meaning. [10] In the process of multimedia teaching and learning, the learners are the focus of an interactive class and the teacher promotes a process of learning which allows the learners to predict, hypothesize, manipulate, raise questions, objects, investigate, research, and invent.

Conclusions and summary

The good use of the network-based multimedia and mobile device based teaching method is a beneficial way to optimize the learning and teaching process. While dealing classes, we can make full use of the learning and teaching approach of the network technology in order to improve the quality. However, we should bear in the kind that it can't be abused. We have to choose the audio-visual teaching program multimedia in a rational way in accordance with the contents of the text to reach the goal that we can achieve the aim of optimizing learning and teaching process. As a result, the paper aims to realize the significance and necessity of application of multimedia in English teaching while properly dealing with the teacher-media-student bond. All in all, with the help of modern education technology, the multi-level originality and nature of learning and teaching are completely guaranteed. When it comes to the processes of training students' basic language skills, a great number of teaching methods are easy to find. Therefore, some disadvantages of traditional English teaching could be conquered. The goal of deepening the impression, strengthening memory,

arousing interest, promoting students' individual learning and so on will be definitely realized with the help of it. In the future, we plan to mine the more flexible usage of mobile network to modify the proposed framework.

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