

A MODEL OF DIGITAL PIANO TRAINING SYSTEM TO IMPROVE THE COMPREHENSIVE PERFORMANCE OF PRE-SCHOOL EDUCATION MAJOR STUDENTS: A CASE STUDY AT A PUBLIC UNIVERSITY IN HUNAN, CHINA

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ABSTRACT: *The purpose of this study is to improve the digital piano comprehensive teaching level of students majoring in preschool education in Hunan province, China. This is a mixed method research, which includes both qualitative and quantitative data. The researcher conducted semi-structure interviews with 8 digital piano group teachers, it is concluded that the digital piano group teachers seldom use the complete teaching system and effective technology to integrate into the actual teaching activities. The researcher then utilized the TPACK framework, to selected Piano Performance Skills, Digital Piano Teaching level and Basic Music theory as Training and evaluation to construct a Digital Piano Training System (DPTS). The DPTS system was tested at a public university in Hunan province that offers a digital piano course and has 360 pre-school students, 30 students were selected and given a one-month. After comparing pre and posttest, the results revealed that after receiving the DPTS training system, students have significantly improved in three aspects: Piano Performance Skills, Digital Piano Teaching level and Basic Music theory. Therefore, it was concluded and confirmed that the DPTS was the effective teaching tools in piano teaching for preschool education major students. As the result, the institutions should consider implementing DPTS as one of the piano teaching strategies.*

Keywords: *Digital piano training, Training system, TPACK, Preschool education, Digital Piano Training System (DPTS)*

Introduction

Preschool education is the beginning of lifelong learning, an important part of the modern education system, and plays a special and important role in people's lifelong growth (Cutietta, 1995, 1996).

In China, there has been a transition from “one child” to “two children” policy by

the Government. Consequently, more and more children need access to higher quality preschool education. At the same time, higher requirements are also put forward for college teachers who major in preschool education, because these college teachers will train students to become teachers of various kindergartens in the future. The quality of these students will determine the quality of kindergarten teaching in the future.

Music education, especially piano comprehensive skills, became the most important skills for kindergarten children in the future work of these teachers. Music (piano) preschool education plays an important role in the overall intellectual

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development of early childhood (Li, 2013).

Aiming at the problem that the piano comprehensive level of students majoring in preschool education in Hunan province is relatively low, this study constructed a digital piano teaching model suitable for such students.

Literature Review

Preschool Education Major

Swiss psychologist Piaget (1976) cognitive theory in the field of preschool education, the development of children's emotion and children's behavior research, kindergarten and primary school cohesion of experiment research, special children's education, etc. American education act places the development of preschool education and the preparation of all preschool children at the top of the eight educational goals in the United States and stipulates them in the form of federal legislation. This is the first time in the American education legislation, which indicates the importance of the federal government to preschool education. (Sally, & Liu, 2007) In recent years, the British government has paid more and more attention to the development of preschool education in Britain to ensure the potential development and healthy development of every child (Pang & Liu, 2008).

The 2012 Guide to Learning and Development of Children aged 3-6 issued by the Ministry of Education of China (Ministry of Education, 2012) points out that art is an important form of human beauty, expression and creation of beauty, and a unique way to express one's understanding of the world around and the accompanying emotional attitude. The development of preschool education majors in colleges and universities in Hunan province is relatively outstanding on the whole, and the education-related

subjects are very mature, but the development of art education, especially piano education, is relatively weak.

The Origin and Development of Digital Piano

Digital pianos appeared in the 1960s and 1970s and became popular in the 1980s and 1990s. In general, the digital piano is provided with the programs for controlling voices, rhythms and obligators. The Voice selector of the conventional digital piano is disposed on the main keyboard thereof, and each voice corresponds to one key. This music instrument can be connected through headphones, players can play in the same space (Fisher, 2010).

Because of the unique teaching method that digital piano can achieve, teachers can realize one-to-many teaching. Digital pianos are widely used in music school teaching and music studios to replace traditional instruments. (Isacoff, S. 2012).

Training System

Training system is a set of guidelines or strategies on which a teacher's teaching method is based. Effective training systems are based on learning theory. Design is more than a process; the process and the resulting product represent a framework of thinking" (Driscoll & Carler, 2005) All provide step-by-step guidance for developing instruction" was pointed out by Suppasetsee (2005). For example, ADDIE System (Analysis, Design, Development, Implementation, and Evaluation), Dick and Carey System, Kemp System, Engagement, Exploration, Explanation, Elaboration, Evaluation 5E System by Bybee, et al. (2006) and so on.

TPACK Framework

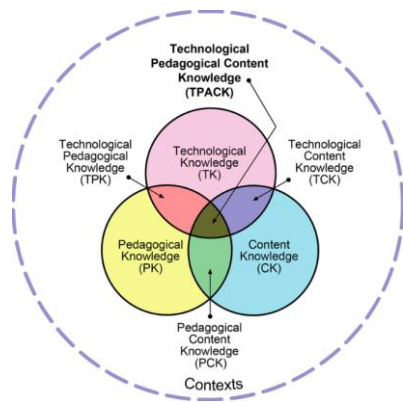


Figure 1: TPACK Framework by Koehler & Mishra (2009)

Technological pedagogical content knowledge (TPACK) is a framework to understand and describe the kinds of knowledge needed by a teacher for effective in a technology-enhanced learning environment. Koehler & Mishra (2009) added technology as a systeming element to Shulman's (1986,1987) pedagogical content knowledge (PCK) construct.

The TPACK framework further emphasizes the cross-knowledge types between three main forms (Koehler & Mishra 2009): Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK).

Digital Piano Training System

A course teaching system about digital piano teaching, which includes the selection of teaching materials, implementation guidance and evaluation standards. In 1990, a computer-based piano tutor system was developed for learners struggling in the entry-level learning. In 2000, Hosaka (2001) used an audio-visual material developed based on an electronic computer. In 2001 (Matsumoto, 2001), piano teaching materials were first applied to CAI. In 2005, Suzuki (2005) developed net-capis system

and introduced the connection with music laboratory (ML) network, which perfectly combined technology and music. Attempts to improve the teaching methods include using exercise sheets (Imaizumi, 2004) and observing others (Nakajima, 2002). (Ogura, 2006) introduced mixed learning using MIDI audio sources.

Tencent QQ

It is an instant messaging software service and portal website developed by the Chinese technology giant Tencent. QQ provides services that provide online social games, music, shopping, Weibo, movies, and group and voice chat software. (Gao & Cao, 2010); (Wu & Frantz, 2012).

In addition, QQ also has the functions of chatting with mobile phones, video calls, voice calls, point-to-point interrupted transfer files, transfer offline files, shared files, QQ mailboxes, network favorites, sending greeting cards, etc., storing files and so on. QQ Group is a public platform for multi-person chat communication launched by Tencent, and group owners can invite friends or people with common interests to chat inside a group after creating a group. In addition to chatting in the group, Tencent also provides group space services, in the group space, users can use group BBS, photo albums, shared files, group video and other ways to communicate. QQ group's concept is to gather wonderful, sharing the world.

Conceptual Framework

The researcher constructed the conceptual framework of this study based on the theory of Chaiyong Brahmawong (2013). The important factors are: knowledges of basic music theory, piano performance skills and digital piano Teaching level.

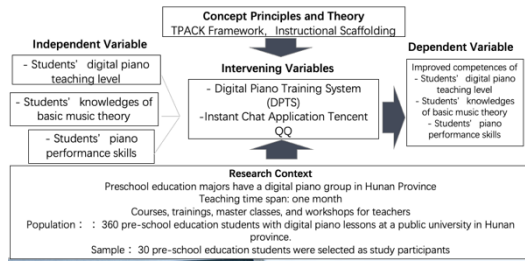


Figure 2: Conceptual Framework Based on Brahmawong (2013)

H₁: Students' digital piano teaching level will improve.

H₂: Students' knowledge of basic music theory will improve.

H₃: Students' piano performance skills will improve.

Methodology

The study was designed as mixed method research, it includes both qualitative and quantitative methods.

Qualitative Research

The researcher conducted semi-structure interviews with 8 digital piano group teachers.

| Item |
|---|
| Section1: For teaching method |
| 1. Question item: How do you teach digital piano? |
| 2. Question item: What is your special teaching methodology in your digital piano classroom? |
| 3. Question item: Why do you choose this teaching strategy? |
| 4. Question item: How long does it take for these teaching methods to work? |
| 5. Question item: What do you think are the components of the best digital piano training system? |
| Section2: For technology integration |
| 1. Question item: What technologies do you use to integrate into your digital piano lessons? |
| 2. Question item: Why you choose this technology in your lessons? |
| 3. Question item: How do you integrate these technologies into your teaching? |

Figure 3: Interview Questions Evaluation of the Interview Validation

Based on the results of the five

experts' assessments of the interview questions, all of them gave scores of at least 3 points (Suitable) to the interview questions of the study, which all recognized the rationality and validity of the research interview questions.

Quantitative Research

The researcher used test as instrumentation. The test is divided into three parts of the content: 1. piano playing skill, 2. digital piano teaching level, 3. music basic theoretical knowledge.

Reliability and Validity of the Instrument

The test rubrics are based on the Examination Syllabus of one public university, preschool education Faculty. Therefore, it was confirmed that the instrument was reliable and valid since the rubrics used in the test based on the standards set by one public university.

Data Analysis and Results

Demographic Information

Thirty participants in this study came from a public university in Hunan province with a major in preschool education.

Table 1: Demographic of Participants

| Gender | Frequency | Percent |
|--------------|-----------|---------|
| Male | 4 | 13.33 |
| Female | 26 | 86.67 |
| Age | | |
| 19 years old | 13 | 43.33 |
| 20 years old | 15 | 50.00 |
| 21 years old | 2 | 6.67 |

There were 26 female participants (86.67%) and 4 male participants (13.33%) Table 4.1 involved in the study. Table 4.2 shown 13 (43.33%) participants aged 19.

Fifteen (50.00%) of the participants were aged 20. There were 2 participants aged 21 (6.67%). The status of all 30 participants (100%) was students.

Descriptive Analysis

Table 2: Mean , Standard deviation , Numbers.

| | Test | N | Mean | SD |
|----------------------------|---------------|----|-------------|-------------|
| Perform- ance skills | Post- Test | 30 | 32.71 03 | 2.185 31 |
| | Pre-Test | 30 | 30.51 17 | 3.174 63 |
| Teaching skills | Post- Test | 30 | 33.56 70 | 1.847 33 |
| | Pre-Test | 30 | 31.11 07 | 2.610 41 |
| Music basic theory | Post- Test | 30 | 17.96 67 | 1.586 22 |
| | Pre-Test | 30 | 16.70 00 | 1.725 07 |
| Total | Post- Test | 30 | 84.24 40 | 5.339 68 |
| | Pre-Test | 30 | 78.32 23 | 7.231 10 |

Since this study was limited to measuring the test scores of students who received after treatment (post-test scores) and before treatment (pre-test scores), the statistical method of paired-samples t-test was used to compare the mean in Table 2.

Paired-Samples T-Test

Table 3: T-test for Students' digital piano comprehensive teaching level

| | | Mean Difference | Sig |
|---|-------------------------|--------------------|-------|
| piano performance skills & Pre- | Post- Test scores | 2.20 | 0.007 |

| | Test scores | | |
|--|--|------|-------|
| digital piano teaching level | Post- Test scores & Pre- Test scores | 2.46 | 0.001 |
| knowledge of basic music theory | Post- Test scores & Pre- Test scores | 1.27 | 0.012 |

Hypotheses Testing

The statistical method of paired-samples t-test was used to calculate the mean scores of the pre-test and post-test in three aspects of the piano test, and the mean value of each item was p value less than 0.05, so all the research hypotheses were valid. Posttest scores significantly higher than Pretest scores in piano performance skills, digital piano teaching level and basic music theory.

Conclusion

The results showed that students in the group, when combining DPTS training system with APP QQ, significantly improved their scores of piano performance skills, digital piano teaching level and basic music theory. Therefore, it was concluded and confirmed that the DPTS was the effective teaching tools in piano teaching for preschool education major students. As the result, the institutions should consider implementing DPTS as one of the piano teaching strategies.

Recommendations

It is strongly recommended that university or company executives in a related field invest in creating applications. The

technical aspects of the application must be "user-friendly" and easy to use. Secondly, for the success of the activity, managers must pay attention to the needs of integrating the market (i.e. the development needs of the early childhood education industry). Finally, universities and corporate managers in related fields should keep up with The Times in terms of learning content and trends, because the professional training of preschool education is totally dependent on the direction of the country and even the whole world for early childhood development.

References

- Beck, R. H. (Ed.). (1956). *The Three R's Plus: What Today's Schools are Trying to Do--and why*. U of Minnesota Press.
- Brahmawong, C., (2013). Research and development in educational technology and communications. *Research in Educational Technology and Communications*, Bangkok: Sukothai Thammathirat Open University Press, 2013, pp. 9-44.
- Bybee, R. W., Taylor, J. A., Gardner, A., Van Scotter, P., Powell, J. C., Westbrook, A., & Landes, N. (2006). The BSCS 5E training system: Origins and effectiveness. *Colorado Springs, Co: BSCS*, 5, 88-98.
- Cutietta, R. (1995). Does music instruction help children to read? *General Music Today*, 9(1), 26-31.
- Dannenberg, S., Jheph, C. & Joseph, S. (1990). A computer-based multi media tutor for beginning piano students, *Interface Journal of New Music Research* 19(2-3): 155–173.
- Dewey, J. (1938). *Experience and education: Kappa Delta Pi*. Indianapolis, 1998, 14.
- Dewey, J. (2013). The school and society and the child and the curriculum. *University of Chicago Press*.
- Dick, W., Carey, L., & Carey, J. O. (2005). The systematic design of instruction.
- Driscoll, M., & Carliner, S. (2005). Advanced web-based training: Adapting real world strategies in your online learning.
- Duke, D. L. (1978). *The Retransformation of the School: The Emergence of Contemporary Alternative Schools in the United States*.
- Fisher, C. (2010). *Teaching Piano in Groups*. Oxford University Press.
- Gao, Y., & Cao, T. (2010). Memory Forensics for QQ from a Live System. *JCP*, 5(4), 541-548.
- Golding, L., & Gray, I. (Eds.). (2008). *Continuing professional development for clinical psychologists: A practical handbook*. John Wiley & Sons.
- Hayes, W. (2006). *The Progressive Education Movement: Is it Still a Factor in Today's Schools?*. Rowman & Littlefield Education. 15200 NBN Way, PO Box 191, Blue Ridge Summit, PA 17214-0191.
- He, K, H. (2017). Theoretical basis of TPACK and its important significance and influence on educational informatization. *Teaching materials for Primary and secondary schools*, 000(010), 4-9.
- Herbart, J. F. (1971). Selections from Outlines of Educational Doctrine. Transl. JW Hillesheim & GG Pfister. *Theory and Practice in the History of American Education: A Book of Readings*, 53-59.
- Hosaka, T. (2001). The use of audio visual education materials for piano study, *Journal of Chikushi Jyogakuen Junior College* 35: 115–128.

- Huang, P. J. (2008). Overview of the application status of QQ in education and Teaching. *Heilongjiang Sci-Tech Information*, 000(023), 180-180.
- Isacoff, S (2012). *A Natural History of the Piano: The Instrument, the Music, the Musicians—from Mozart to Modern Jazz and Everything in Between*. Knopf Doubleday Publishing Group. ISBN 9780307279330.
- Kemp, J. E., Morrison, G. R., Ross, S. M., & Kalman, H. (2004). *Designing effective instruction*. Hoboken.
- Koehler, M., & Mishra, P. (2009). What is technological pedagogical content knowledge (TPACK)? *Contemporary issues in technology and teacher education*, 9(1), 60-70.
- Lee, T. H. (2000). *Education in traditional China: A history* (Vol. 13). Brill.
- Li, J. (2013). On the necessity and rationality of piano course setting for preschool education in normal universities. *Voice of the Yellow River*. (12)
- Matsumoto, T. (2001). The status of beginners in piano playing regarding the acquisition of basic skills and the status and issues of cai learning using computer systems, *Yojikyoiku Special Issue* pp. 42–56.
- Murphy-Latta, T. (2008). *A comparative study of professional development utilizing the Missouri Commissioner's Award of Excellence and indicators of student achievement* (Doctoral dissertation, University of Kansas).
- Pang, L. J., & Liu X, L. (2008). Policy and legislation on the reform of the management system of preschool education in Britain. *Research on preschool education* (1), 32-35.
- Pea, R. D. (2004). The social and technological dimensions of scaffolding and related theoretical concepts for learning, education, and human activity. *The journal of the learning sciences*, 13(3), 423-451.
- Piaget, J. (1976). Piaget's theory. In *Piaget and his school* (pp. 11-23). Springer, Berlin, Heidelberg.
- Reiser, B. J. (2004). Scaffolding complex learning: The mechanisms of structuring and problematizing student work. *The Journal of the Learning sciences*, 13(3), 273-304.
- Sally, P, L& Liu, X, L. (2007). Strengthening the government's responsibility in the development of preschool education through legislation -- the experience of the United States and its enlightenment to China. *Preschool education research* (2), 3-9.
- Sawyer, R. K. (2005). *The Cambridge handbook of the learning sciences*. Cambridge University Press.
- Shulman, L. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, 15(2), 4-14,
- Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, 57(1), 1-22.
- Sun, S. (2011). Problems and countermeasures in piano teaching of preschool education in normal universities. *Animated world: educational technology research* (10), 35-36.
- Speck, M., & Knipe, C. (Eds.). (2005). *Why can't we get it right? Designing high-quality professional development for standards-based schools*. Corwin Press.
- Sugie, S. (2012). Instructional Design of the Communicative Blended Learning for Chinese as a Foreign Language. COLLA 2012, *The Second*

- International Conference on Advanced Collaborative Networks, Systems and Applications.*
- Sun, T. T. (2014). Problems and countermeasures of piano teaching in preschool education. *Industry and technology BBS* (3).
- Suzuki, H. (2005). "e-learning" in piano teaching –practice in the center for practical education –, *Journal of practical education* 19: 11–22.
- Swift, A. (1997), "A brief Introduction to MIDI", SURPRISE, Imperial College of Science Technology and Medicine, archived from the original on 30 August 2012, retrieved 22 August 2012
- Yuan, A. L. (1997). Characteristics of preschool teacher training in the United States. *Preschool education* (12), 18-18.
- Wang, Y., Kong, W. Q., Zhang, P., & Dong, Y. (2009). A Preliminary study on improving the self-efficacy of distance learners by using QQ group teaching method. *Modern distance Education* (1), 51-53.
- Wu, J. P., & Frantz, T. L. (2012). Largest IM Platform in China Tencent QQ. *Journal of Business Case Studies (JBCS)*, 8(1), 95-102.
- Zhu, B. C., Zhu, T. T., & Jiang F. (2013). Exploration of the Organization and Implementation of Teacher Education Curriculum in Preschool Education Majors in Colleges and Universities—Based on the Practice-oriented Concept of Teacher Education Curriculum Reform. *China Science & Education Innovation Guide* (28), 7-8
- Zhu Qi. (2013). Advantages and Disadvantages of Collective Digital Piano Lessons in Normal Universities. *Youth years*, 000(007), 179-179.