An Exploration of the Significance, Challenges, and Solutions of the E-learning Platform for Middle School Teachers' Professional Development

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Abstract: The purpose of the present study is to investigate the significance, challenges and solutions of implementing the E-learning platform into middle school teachers' professional development. Results showed that the convenience, the immediacy of communication, students' records and information storage, and the development of teachers' ICT-related competencies were the main features that teachers mostly took advantages of. Meanwhile, teachers reported most frequently of the disadvantages of the operational obstacles, which provided various defects about incorporating communication software during teaching and learning.

Keywords: E-learning platform, teachers' professional development, middle school

1. Introduction

E-learning platform is a practical platform for interactive teaching and learning. Research has shown that E-learning platform can help improve the academic performance of learners, providing new ideas and methods for pedagogical innovations and teaching reforms (Piper et al., 2018). In recent decades, E-learning platform has attracted increasing interests, and has been widely employed in more and more schools in China. Especially, E-learning platform has playing a significant role in teacher professional development. Indeed, the personalization of the learning process is expected to increase teachers' satisfaction and learning efficiency (Crecci & Fiorentini, 2018). Nevertheless, the difficulty is how to give full play to the interactive function of the platform and how to improve the enthusiasm of the teachers to use the platform (Heyd-Metzuyanim, Munter, & Greeno, 2018). It should be noted that the insights into the particular influence the E-learning platform exerts in the process of teacher professional development and how it is exercised still need to be developed (Cheng & Wu, 2016). In the present study, an E-learning platform was designed and implemented as a way to promote teacher professional development at a key middle school located in southwest China. This study aims to investigate the significance, challenges and solutions that the E-learning platform has brought about professional development for middle school teachers.

2. Background of the E-learning Platform

First, teachers' ICT-related competencies were relatively undeveloped. The most commonly used instructional software is WORD, EXCEL, PPT and Flash. However, most teachers only used the basic functions, such as documents processing and spreadsheets creation, etc. Science teachers seldom used the Geometry Sketchpad. Second, the teachers were able to use the computers, IPADs and projectors skillfully, however, the use of these ICT equipment were more to show the PPT slides or arrange classroom exercise, which only played the role of blackboard. Third, the teaching and learning outcomes could not be digitalized. Most teachers could master the existing paperless marking system, which actually was a simple

data-processing system, only deal with the average scores, highest scores and simple item analysis. It was obvious that this system could not meet the requirements for teaching and researching, especially for teachers and students' individualized development.

In 2018, considering the previous exiting challenges, the Guilin Middle School, collaborated with IFLYTEK Company, implemented an "Internet +" E-learning platform, which incorporated Cloud computing, 5G technology, Big data, Artificial Intelligence (AI) applications, to establish the digital learning ecosystem, promote personalized learning outcomes, support teachers' professional development and school-based management. The major functions of the E-learning platform system were consisted with Smart Management, Smart Instruction, Smart Learning and Smart School Service. To be specific, the most commonly used sub-system for teachers' professional development were the big data precise teaching system, the school-based exercises library, the smart classroom system, the new college entrance examination courses arrangement system, and the teachers' instructional evaluation system. From 2018 to 2019, the big data precise teaching system had been used 501 times to organize the subject examinations, covering 148 teachers and 42 classes in the school. The total number of subject exercises in the school-based exercises library is 1400, and the usage rate was reported at 99.18%. The smart classroom system had been integrated into 4 classes, including 23 teachers and 159 students' teaching and learning. The new college entrance examination courses arrangement system had simulated 17 courses for the new college entrance examination, accumulated the experience of courses arrangement and further improved the efficiency of curriculum management. The teachers' instructional evaluation system had been incorporated into the school-based teachers' professional learning programs, to develop teachers' ICT-related teaching and learning competencies.
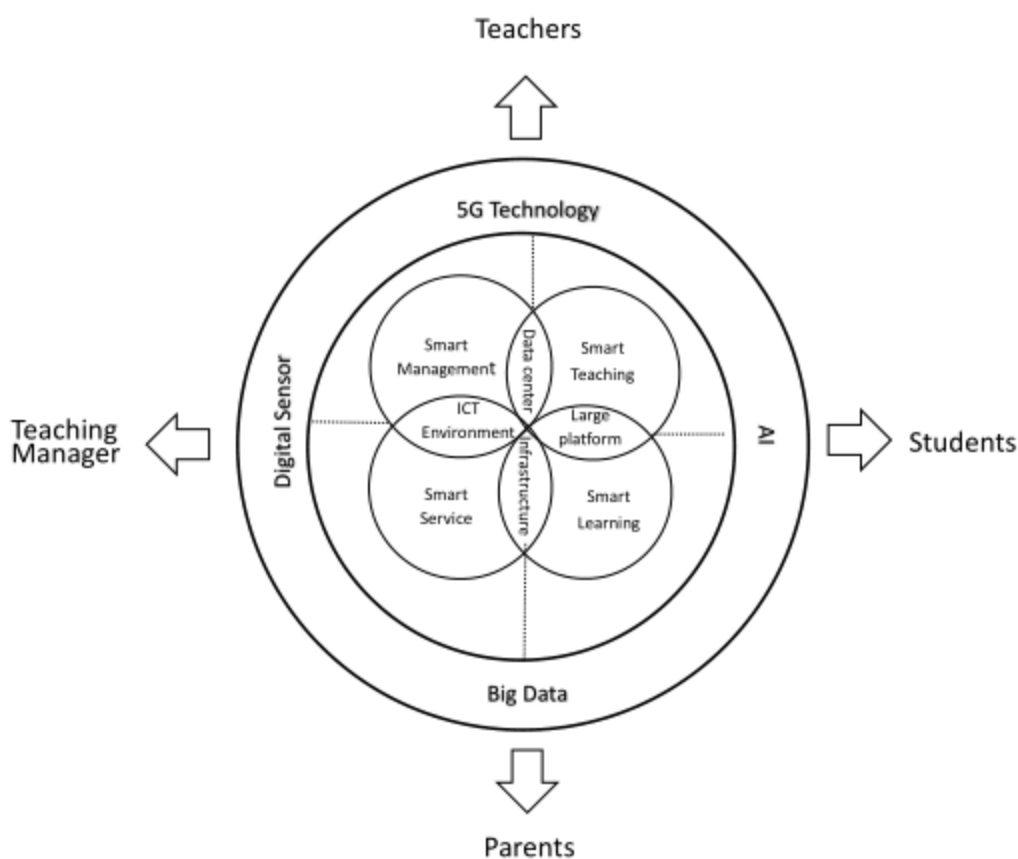

Figure 1. The implementation framework of the E-learning platform in Guilin School

3. Procedure

The participants of this study involved 79 middle school teachers (including 49 female teachers and 30 male teachers) from a key middle school, which was leading the use of E-learning platform in the City of Guilin, southwest China. They majored in different specializations, for example, Chinese, English, Mathematics, Physics, Chemistry, History and Politics. Of them, 62% of them (n=49) were science teachers, while 38% of them (n=30) were liberal arts teachers, aged from 29 to 51. These teachers had at least 4 years of teaching experiences in this school. In 2018, the school redesigned its teacher professional development strategies and integrated the E-learning platform to teachers' training to equip teachers with ICT-related competencies. Its ultimate goal was to prepare teachers as qualified knowledge instructors equipped with efficient ICT-related competencies, to create or manage teaching resources to transform learning in a meaningful way.

To probe teachers' view of implementing this E-learning platform, the qualitative case study approach was adopted. Ten focus groups of semi-structured interviews were employed as the main method for data collection. The interview questions were mainly about the challenges, assistance, advantage, and disadvantage of incorporating the E-learning platform into teachers' learning and teaching. All focus group interviews were audio-taped and transcribed. A constant comparative method was employed for data analysis (Strauss & Corbin, 1990). First, open coding was performed on the transcript of teachers. Categories were followed by grouping the labels on open coding. After that, the relationships between the codes and the categories were explicated through the axial coding. In the constant comparative analysis processes of comprehension and synthesis, the concepts and categories relevant to E-learning platform and teacher professional development were identified and investigated until saturation was reached and carefully woven into descriptions of the teachers' experiences or practices. Finally, the coding frameworks were derived based on teachers' responses in order to generate a clearer picture of teachers' perspectives towards the application of E-learning platform in their own teaching and learning.

4. Finding and Discussion

4.1 The Significance of the E-learning Platform in Teachers Professional Development

First, the E-learning platform optimized the educational resources allocation. With the help of the E-learning platform, the teachers felt convenient to develop school-based learning resources, based on the knowledge framework of textbooks, and systematically constructed teaching resources with teaching design, learning plans and micro-lessons as the main contents. The teachers also established a series of independent learning resource packages with all knowledge points of the whole specialization, in accordance with the teaching resource system of "one lesson and one network".

Second, the E-learning platform strengthened the immediacy of communications between teachers and students, and among teachers, and further expanded teachers' classroom teaching space. The E-learning platform provided supports for teachers to use Text, Video, Audio, PPT, Documents, Flash animation and other multimedia technologies to produce learning cases, lesson courseware, and micro lesson preparation. These teaching materials could be uploaded to the E-learning platform for sharing.

Third, the E-learning platform is efficient for students' and teachers' records and information storage. Every teacher and student had an individual E-portfolio to keep personal and professional development records. On one hand, the E-learning platform will generate the data of the students' examination results for the teachers and teachers would grasp the learning situation accurately. On the other hand, the data of teachers' professional development could be able to store in their E-portfolios, in order to track development records of the teachers. And personal learning data analysis for teachers and students would be generated annual year.

Fourth, the E-learning platform is an effective tool for the development of teachers' ICT-related competencies. The teachers could participant in the professional courses or programs to develop their ICT-

related competencies through the E-learning platform. Meanwhile, this platform also provided some tests and instructions to guide the teachers as well.

4.2 The Existing Challenges and Solutions for the E-learning Platform Implementation

First of all, the most frequently of the disadvantages of the E-learning platform was the operational obstacles, which provided various defects about incorporating communication software during teaching and learning. The teachers had not been competent enough to deal with the technological problems in the process of teaching and learning. Furthermore, the teachers believed that there should be more network security strategies. Finally, the teachers complained about the application of software and teaching resources were still limited. The practical instructional directions were highly demanded.

The proposed suggestions for establishment of an effective guarantee mechanism to the E-learning platform implemented in teachers' professional development maybe analyzed from the following perspectives:

- *The In-depth Integration for Teachers' Professional Development*

The school established the Office of Information Application Development and issued the Implementation Plan of Digital Campus in 2018. However, the Office of Information Application Development should work collaboratively with the Office of Teachers' Development to ensure the E-learning platform integrated with the teachers' professional learning. Therefore, there is still a need to enhance the space construction and application management for the E-learning platform. For instance, the school should improve the assessment and evaluation standards for teachers' ICT-related competencies, organize teachers' professional learning for ICT innovative applications, and fully realize the normalization of ICT instructional applications in the school.

- *The Financial Supports*

The school should develop long-term strategies to increase the capital investment for the E-learning platform development. To be specific, it is urgent to give priority to the construction of instructional hardware, and optimize the digital learning environment and resources. In accordance with the MOE of China, the school needs to apply special funds from multi-channels to support the sustained development of the E-learning platform.

- *The Information Security*

The school should establish a network security mechanism, to implement the responsibility of school network security, to organize regular educational training sessions on network security, and to regularly arrange technicians to protect the E-learning platform for teachers and students.

5. Conclusion

The purpose of the present study was to identify the significance, challenges and solutions of implementing the E-learning platform into middle school teachers' professional development. According to the result, the convenience, the immediacy of communication, students' records and information storage, and the development of teachers' ICT-related competencies were the main advantages for teachers. Meanwhile, the most frequently of the disadvantages were the operational obstacles. And the proposed solutions were mainly from perspectives of the in-depth integration for teacher professional development, the financial supports, and the information security. In conclusion, the results obtained from the current study may provide feedback and future directions to educators and researchers to improve the E-learning platform implemented in teachers' professional development.

Acknowledgements

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