

Research on the Impact of e-Schoolbag on Teachers' Professional Development: from the Perspective of Teachers

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Abstract: E-schoolbag, as an important information technology application in the field of education in China, not only promote students' learning, but also have a positive effect on the teaching of teachers. In order to understand the impact of e-schoolbag on the professional development of teachers, this study used the feedback data of 1004 Chinese teachers collected in the 2016 e-Schoolbag package pilot project in S city of China, and analyzed the impact of e-Schoolbag on the professional development of teachers from the perspective of teachers. We mainly examine the two dimensions of teaching ability and information literacy. The results showed that teachers generally think that the application of e-Schoolbag promotes the development of their professional abilities. However, some factors, such as teaching ages and the length of application of e-Schoolbag, may cause certain degrees of effect on teachers' perception of e-Schoolbag on their professional development.

Keywords: e-Schoolbag, teachers' professional development, teaching ability, information literacy

1. Introduction

The rapid development of information technology has gradually transformed the classroom, and it aims to improve the teaching and learning by optimizing the teaching process. With the rise of "1:1 computing" and "Bring Your Own Device" (BYOD), various types of digital learning applications based on mobile device have become a popular study and practice theme in education in many countries and are seen as an effective way to promote teaching and learning. In BYOD, students bring personal mobile devices to school for learning (Norris & Soloway, 2011). While "1:1 computing" refer to projects where technology is available to all students and their teachers (Bebell & O'Dwyer, 2010; Gu et al, 2017), and students can use mobile terminals (such as laptops and tablets) access the internet, digital learning resources, electronic textbooks, and so on (Guan & Riezebos, 2015). In China, a similar digital learning project is the "e-Schoolbag", which emerged after 2010. E-Schoolbag provides a personal learning environment that integrates electronic textbook reader, virtual-learning tools, and connect the appropriate learning service (Zhu & Yu, 2011).

Different provinces and cities in China have carried out pilot projects of e-Schoolbag at different levels. Many explorations have been made in the application of e-Schoolbag and digital materials, and positive progress and results have been achieved. Moreover, many Chinese researchers have studied the application effect of e-Schoolbag in schools. Most of the studies investigated the impacts on students' academic performance, learning experience and other aspects about the application of e-Schoolbag in specific subject, which is from a perspective of students and teachers, (Zhang et al, 2013; Guan et al, 2014). However, teachers are also the key factors when it comes to integrating the e-Schoolbag into the instruction system (Guan et al, 2014). It is incomplete

and inaccurate if we just consider its impacts on students when we study the application effect of e-Schoolbag in teaching. The existing research on the impact of e-Schoolbag on teachers mainly focuses on teachers' understanding of e-Schoolbag, satisfaction with their use, and acceptance et al. (Zhou et al, 2016; Zhang et al, 2015; Zhang et al, 2015;). However, few researches studied the impact of the application of e-Schoolbag on teachers' teaching ability, teaching methods, teaching thinking, teaching patterns, etc. Some studies have shown that the evaluation of the application effect of e-Schoolbag should be comprehensively in terms of academic achievement levels, skills development in the 21st century, development of information literacy, teachers' professional development, improvement of classroom teaching quality, and reform of school systems. (Tong et al, 2016). Many teachers also clearly expressed their desire to transform the way of teaching and learning with e-Schoolbag, and gradually promote their professional development (Guan et al, 2014). So that we should also consider its impact on the teachers' professional development when we investigate the effect of the application of e-Schoolbag in teaching.

The purpose of this study is to explore the attitude of Chinese teachers about the impact of e-Schoolbag on their professional development, and further analyze the influences of teaching ages and the application time of e-Schoolbag on teachers' perceptions.

2. Research Design

2.1 Research Methods and Data Sources

This study used the feedback data of 1004 Chinese teachers collected in the 2016 e-Schoolbag package pilot project in S city of China. Items were set up to investigate the impact of e-Schoolbag on teachers' professional development from two dimensions: teaching ability and information literacy. In the survey questionnaire, the Likert scale was applied, for each topic and the five options count 1 to 5 points, respectively. Validity analysis of the questionnaire used structural validity analysis. KMO is one of the validity test indicators for the main component analysis. If the value is above 0.9, it means that it is very suitable for factor analysis. The SPSS 23.0 analysis found that the KMO value is 0.905, which is greater than 0.5, and also greater than 0.9, indicating that the questionnaire has a good structural validity.

2.2 Participants

The participants are 1004 Chinese teachers, and from elementary, middle, and high schools. In terms of gender distribution, most of them are female, accounting for 85.86%. We divided teaching age into 1 to 5 years (novice teacher) and more than 5 years (senior teacher). Most of the teachers have rich teaching experience, and only 33.07% of the pilots have teaching for less than five years. The teachers surveyed belong to different disciplines and teach mainly in Chinese, mathematics, and English. In the application time of e-Schoolbag, we divided it into 0~2 semesters (short-term) and more than 2 semesters (long-term), and the short-term accounted for 52.69%, and 47.31% for long-term. Basic statistical information of the sample shown in Table 1.

Table 1

Sample basic information statistics

Independent Variable	Groups	Valid Sample	Percentage
Gender	Male	142	14.14%
	Female	862	85.86%
Teaching age	1~5 years(novice teacher)	332	33.07%
	More than 5 years(senior teacher)	672	66.93%
Discipline	Chinese	333	33.17%
	Mathematics	221	22.01%
	English	202	20.12%

	Others	248	24.6%
Application time	0~2 semesters(short-term)	529	52.69%
	More than 2 semesters(long-term)	475	47.31%

3. Results

3.1 Teacher's Perception of the impact of e-Schoolbag on Teaching Ability

In order to know the teachers' perception about the impact of the e-Schoolbag on their own teaching ability, there are seven items in the questionnaire. By counting the scores, we got the mean value of 1004 Chinese teachers under each item.

3.1.1 The Influence of Different Teaching Age

From the results of mean value statistics and independent sample t-test, we can get the teachers' perception of the impact of e-Schoolbag on their teaching ability with different teaching age. Table 2 shows that as items 1, 3, 5, the senior teachers get lower mean value than the novice teachers, which indicate that senior teachers have a better effect perception than novice teachers do in these three items. For the reverse item 7, the mean value of novice teacher is higher, which shows that the senior teacher feels more that the application of e-Schoolbag increases the preparation burden. Combined with the results of the independent sample t-test, the p-values of five items were all less than 0.05, which means that teachers with different teaching age, whose perception of the effect of e-Schoolbag on teaching ability exist significant differences in these three items.

Table 2

Teachers' Perception on Their Teaching Abilities with Different Teaching Age

Teachers' professional development - teaching ability	Teaching age	N	Mean	SD	p-value
1. I can achieve a high-level teaching objectives	1~5 years	332	2.41	.883	.145
	More than 5 years	672	2.39	.956	
2. My teaching ability has improved	1~5 years	332	2.34	.914	.042*
	More than 5 years	672	2.36	.987	
3. My instructional design has improved	1~5 years	332	2.26	.923	.041*
	More than 5 years	672	2.33	.990	
4. My ability to communicate, discuss, and generalize with students has improved	1~5 years	332	2.16	.847	.020*
	More than 5 years	672	2.16	.923	
5. I have increased my awareness of mastering the individual learning process and providing individual guidance	1~5 years	332	2.08	.877	.861
	More than 5 years	672	2.06	.874	
6. I think the integration of technology and discipline has promoted my professional development	1~5 years	332	2.14	.846	.027*
	More than 5 years	672	2.14	.928	
7. My workload for preparing lessons have been increased	1~5 years	332	2.28	1.007	.027*
	More than 5 years	672	2.01	.980	

3.1.2 The Influence of Different Application Time

From the results of mean value statistics and independent sample t-test, we can get teachers' perception of the impact of e-Schoolbag on their teaching ability with different application time. As shown in Table 3, in terms of the mean values of the first 6 positive items, the short-term teachers

higher than long-term teachers, while in the inverse item 7, the short-term teachers get higher mean values. Combined with the results of the independent sample t-test, the P values of the two items are less than 0.05. They are item 4, 6. That reveal that teachers with different application time exist significant differences in these two items in the perception of the effect of on teaching ability.

Table 3

Teachers' Perception on Their Teaching Abilities with Different Application Time

Teachers' professional development - teaching ability	Application time	N	Mean	SD	p-value
1. My classroom teaching can achieve a high-level teaching objectives	0~2 semesters	529	2.51	.907	.708
	More than 2 semesters	475	2.27	.944	
2. My teaching ability has improved	0~2 semesters	529	2.47	.957	.447
	More than 2 semesters	475	2.23	.955	
3. My instructional design has improved	0~2 semesters	529	2.40	.953	.628
	More than 2 semesters	475	2.21	.977	
4. My ability to communicate, discuss, and generalize with students has improved	0~2 semesters	529	2.26	.909	.038*
	More than 2 semesters	475	2.05	.875	
5. I have increased my awareness of mastering the individual learning process and providing individual guidance	0~2 semesters	529	2.15	.879	.093
	More than 2 semesters	475	1.97	.863	
6. I think the integration of technology and discipline has promoted my professional development	0~2 semesters	529	2.23	.912	.012*
	More than 2 semesters	475	2.03	.878	
7. My workload for preparing lessons have been increased	0~2 semesters	529	2.06	.960	.066
	More than 2 semesters	475	2.14	1.036	

3.2 Teacher's Perception of the Impact of e-Schoolbag on Information Literacy

In order to know the influence of the e-Schoolbag on teachers' information literacy, we set 7 items in the questionnaire. By counting the scores, we got the mean value of 1004 teachers under each item.

3.2.1 The Influence on Information Literacy of Different Teaching Age

Through mean value statistics and independent sample t-test, we can know that teachers' perception of the impact of e-Schoolbag on their information literacy with different teaching age. Table 4 shows that there are three items that the novice teachers get lower mean value than the senior teachers, which indicates that novice teachers have a better perception than senior teachers in these three items. They are item 5, 6, 7. Combined with the results of the independent sample t-test, the p-values of items 3,5,6 were all less than 0.05, which means that teachers with different teaching age, whose perception of the effect of e-Schoolbag on information literacy exist significant differences.

Table 4

Teachers' Perception on Information Literacy with Different Teaching Age

Teachers' professional development - teaching ability	Application time	N	Mean	SD	p-value
1. I have improved the level of computer operations	1~5 years	332	2.11	.909	.614
	More than 5 years	672	2.08	.928	

2.I have improved my ability to obtain information	1~5 years	332	2.09	.883	.111
	More than 5 years	672	2.08	.942	
3.When facing with technical problem, I would like to try to solve it by myself	1~5 years	332	2.14	.869	.023*
	More than 5 years	672	2.08	.914	
4.I can integrate technology into the subjects I teach	1~5 years	332	2.11	.884	.180
	More than 5 years	672	2.10	.896	
5.I enjoy finding and applying the techniques and tools which can help my teaching	1~5 years	332	2.04	.818	.033*
	More than 5 years	672	2.08	.885	
6.I can help other teachers apply technology to teaching	1~5 years	332	2.22	.889	.002*
	More than 5 years	672	2.32	.991	
7.I can use technology to teach in common teaching process	1~5 years	332	2.12	.820	.090
	More than 5 years	672	2.13	.907	

3.2.2 The Influence on Information Literacy of Different Application time

From the results of the mean value statistics and independent sample t-test, we can know that teachers' perception of the impact of e-Schoolbag on their information literacy with different application time. As shown in Table5, in terms of the mean value, the short-term teacher are all higher than long-term teachers. Combined with the results of the independent sample t-test, the P values of items 3,4,7 are less than 0.05. That means teachers with different application time exist significant differences in these two items in the perception of the effect of on information literacy.

Table 5

Teachers' Perception on Information Literacy in Different Application Time

Teachers' professional development - teaching ability	Application time	N	Mean	SD	p-value
1.I have improved the level of computer operations	0~2 semesters	529	2.19	.909	.421
	More than 2 semesters	475	1.98	.924	
2.I have improved my ability to obtain information	0~2 semesters	529	2.19	.908	.505
	More than 2 semesters	475	1.97	.925	
3.When facing with technical problem, I would like to try to solve it by myself	0~2 semesters	529	2.12	.916	.013*
	More than 2 semesters	475	2.02	.871	
4.I can integrate technology into the subjects I teach	0~2 semesters	529	2.21	.882	.011*
	More than 2 semesters	475	1.98	.854	
5.I enjoy finding and experimenting the techniques and tools which can help my teaching	0~2 semesters	529	2.16	.866	.261
	More than 2 semesters	475	1.96	.850	
6.I can help other teachers apply technology to teaching	0~2 semesters	529	2.38	.968	.123
	More than 2 semesters	475	2.19	.939	
7.I can use technology to teach in usual teaching process	0~2 semesters	529	2.21	.876	.025*
	More than 2 semesters	475	2.00	.869	

4. Discussion

4.1 Teacher's Perception of the Impact of e-Schoolbag on Teaching Ability

By analyzing the attitude of teachers' perception of the impact of e-Schoolbag on their teaching ability, we can conclude that teachers have a quite positive attitude toward the improvement in their teaching ability through e-Schoolbag. Teachers generally believe that the application of e-Schoolbag

can help them to complete their teaching tasks better. For teachers with different teaching age, they have different perceptions of the impact of e-Schoolbag on their teaching abilities. Novice teachers think that the application of e-Schoolbag has a positive influence on teaching abilities and instructional design. Senior teachers prefer that using e-Schoolbag can promote them to reach a higher level of teaching objectives, and help them master individual students' learning process better and enhance the awareness of giving individual guidance. However, the senior teachers' perception of the workload caused by e-Schoolbag is deeper than that of novice teachers. This may due to the senior teachers' acceptance and proficiency of information technology. Teachers of different application time of e-Schoolbag also have different perceptions of the impact of e-Schoolbag on their teaching ability. Teachers with short e-Schoolbag application time think that preparation work is a burden. Compared with teachers with a short application time, teachers who have used for a long time have a deeper sense of identity about the e-Schoolbag. They think e-Schoolbag can improve communication and interaction with students and promote their professional development through the integration of technology and disciplines.

4.2 Teacher's Perception of the Impact of e-Schoolbag on Information Literacy

By analyzing the attitude of teachers' perception of the impact of e-Schoolbag on their information literacy, we can conclude that teachers have a quite positive attitude toward the improvement in their information literacy through e-Schoolbag. Teacher with different teaching age have different perceptions of the impact of e-Schoolbag on their information literacy. Novice teachers believe that the application of e-Schoolbag enhances the awareness of integrating assistive teaching tools and techniques into regular classroom. Senior teachers, however, have a deeper perception of using the ability to solve technology-related problems on their own. Teachers of different e-Schoolbag application time also have different perceptions of the impact of e-Schoolbag on their information literacy. Teachers with a long application time have a better perception effect. The application of e-Schoolbag not only enhances their awareness and ability of applying technology-assisted teaching in classroom, but also cultivates the ability to solve technology-related problems independently.

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