Exploring the changes in teachers' teaching behavior in the environment of e-books

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Abstract: E-book bags have become a major focus of information technology and education, and their application in education and teaching faces many challenges and problems. As the main actor of information technology and curriculum integration, teachers' teaching behavior changes in the e-book environment play a key role in the advantages of e-books in the field of education. To this end, this study relies on the feedback data of 3204 teachers' questionnaires collected at the end of the 2018 annual project of the S-city e-bag project, analyze the impact of e-books on teachers' teaching behaviors, and compare the previous 2016 and 2017 e-book annual reports to compare teacher behavior changes within three years. The study found that different teaching ages and the length of application of e-books have different effects on teachers' teaching behavior. In addition, the use of e-books has changed the teaching behavior of teachers to smaller every year.

Keywords: E-book bag; teacher behavior, change

1. Introduction

The e-book bag first appeared in Singapore in 1999 and has been in the field of education for nearly two decades. In 2012, BYOD (Bring your own device) was launched in various states and schools in the United States to effectively integrate e-books and other technologies into the school education system to optimize teaching and learning. In China, the 2010 National Information Technology Standardization Committee e-bag standard working group and the Ministry of Education Information Technology Committee set up the "e-textbook-e-book" standard group. The "Development and Publishing Industry's "Twelfth Five-Year Plan" Development Plan" proposed to "strongly support the electronic schoolbag project." The "Shanghai Medium- and Long-Term Education Reform and Development Plan (2010-2020)" proposes: "Promoting the development of 'e-books' and 'cloud computing'-assisted teaching. With the strong support of relevant policies, e-bag projects in all regions are well-organized. Advancement, among which, S City first carried out the experiment of changing the learning mode of digital curriculum environment construction, and after five years of exploration, formed a relatively complete project mechanism. It can be said that the education department of S city applied the electronic schoolbag in exploring education. The pace has been moving forward and never stopped.
However, with the rapid advancement of e-book projects, many difficulties and problems have arisen. Among them, teachers are the key factors for the application integration of e-books in the school context. The changes in teaching behaviors of teachers in the e-book environment will directly affect the advantages of e-books in the field of education. According to the survey, most teachers recognize the value of e-books and believe that e-books can promote teachers' teaching and student learning. At the same time, some studies have shown that using e-books to attend classes increases the burden on teachers. To this end, teachers are reluctant to step out of the comfort zone and change traditional teaching models, such as investigating teachers who are reluctant to use new information technology tools. In fact, e-books can help teachers to synchronize classroom teaching, capture students' learning trends in a timely manner, and adjust teaching organization. The teaching evaluation function of e-bags can also enable teachers to publish and correct exercises online, and realize the instant evaluation of the classroom. These changes are reflected in the teacher's use of e-books. To this end, it is necessary to explore the changes in teachers' teaching behavior in the e-book bag environment. It can not only reflect the teacher's attitude towards the use of e-bags, but also reflect the e-book bag. The actual influence of

education and teaching, thus promoting the continuous development and improvement of the application of e-books.

2. Research Design and Process

2.1 Research Methods and Data Sources

The data source of this study is the feedback data of the teacher survey questionnaire collected in the 2018 e-books pilot project of S City. Among them, the research through the peer experts and front-line teachers to discuss, combined with specific circumstances and needs to form the teacher survey questionnaire, the survey indicators are shown in Table 1. In addition, the study also compared the teacher survey data for 2016, 2017, and 2018, aiming to discover the behavioral changes of teachers in the e-book environment in three years.

Table 1

Survey Dimensions of Teacher Behavior in the Context of E-books

Theme	Indicator item
Teacher behavior in an e-book environment	1. The classroom atmosphere is often active when attending classes for students.
	2. Understand the students' knowledge of the knowledge points, and focus on the lectures.
	3. I like to ask students why
	4. I often feel very fulfilled and are generally loved by students.
	5. Always teach students the knowledge points during class
	6. I like to show the teaching content to the students through multimedia.
	7. Like to continuously guide students to learn independently
	8. I like to encourage students to express their ideas through face-to-face answers, phone calls and internet.
	9. I like to encourage students to communicate through channels such as face-to-face, telephone and internet.
	10. I like to share my teaching experience with my colleagues.

The questionnaire is mainly divided into five scales by the Likert scale (1. Very agree, 2. agree, 3. Uncertain, 4. Disagree, 5. Very disapproval). The lower the survey mean, the higher the recognition of the teacher's description of the teaching behavior. The reliability statistics of the above questionnaires were performed by spss22.0. The results are shown in Table 2. The value of KMO is .983, indicating that the structure of the questionnaire is of good validity, and the value of sig. indicates that the difference is significant.

Table 2

Analysis of the Validity of the Questionnaire

Testing by KMO and Bartlett		
Sample a sufficient Kaiser-Meyer-Olkin metric		.983
Bartlett's sphericity test	Approximate Chi-square	215118.017
	df	1275
	Sig.	.000

2.2 Study Sample Characteristics

There are 3,204 teacher samples in this study, of which the school stage spans elementary, middle, and high schools. In terms of gender distribution, most of them were concentrated in female teachers, accounting for 86.97% (explored) and 83.73% (not piloted) respectively, mainly because of the current

female teachers in primary and secondary school teachers. Most of the teachers have rich teaching experience. Only 33.07% of the pilot teachers and 20.14% of the non-pilot teachers have a teaching age of less than five years. The teachers surveyed are distributed in different disciplines, and they have more subjects in teaching Chinese, mathematics, and foreign languages. In the application time of e-books, among the pilot teachers, the application time reached 36.63% in the 0-2 semester; among the non-pilot teachers, the application time reached 04.03% in the 0-2 semester. The sample basic information statistics are shown in Table 3.

Table 3

Study Sample Basic Information Table

Independent variable	Independent variable Group	Pilot teacher		Untested teacher	
		Valid sample	Percentage	Valid sample	Percentage
Gender	Male	154	13.03%	329	16.27%
	Female	1028	86.97%	1693	83.73%
Teaching age	1~5 years	404	34.18%	423	20.92%
	More than 5 years	778	65.82%	1599	79.08%
Subject	Chinese	391	33.08%	642	31.75%
	Mathematics	274	23.18%	358	17.71%
	English	223	18.87%	339	16.77%
	Other disciplines	294	24.87%	683	33.78%
Application time	0~2 semester	433	36.63%	blank	
	2 semester or more	749	63.37%		

3. Analysis of the survey results

3.1 Comparison of the Changes in Teaching Behavior of Teachers of Different Teaching Ages in the Environment of E-books

Divide the teaching age into 1~5 years or more, and compare the teaching behaviors of the teachers of different teaching ages in the e-bag environment. Obtain the table 3. a It can be found that the new teachers who have been piloted in 2018 and have a teaching age of 1 to 5 years and the old teachers who have been teaching for more than 5 years have significant differences in the teaching behavior in the e-book environment. The overall behavior of the former is more positive.

Table 4

Statistical Table of Changes in Teaching Behavior of Teachers of Different Teaching Ages in the Environment of E-bags

Comparison of teachers of different teaching ages		N	Mean	Standard deviation	Significant
Indicator 1	1~5 years	404	1.99	.800	.028
	More than 5 years	778	1.98	.786	
Indicator 2	1~5 years	404	1.98	.784	.039

	More than 5 years	778	1.95	.780	
Indicator 3	1~5 years	404	1.99	.821	.041
	More than 5 years	778	1.95	.815	
Indicator 4	1~5 years	404	2.00	.797	.040
	More than 5 years	778	1.96	.792	
Indicator 5	1~5 years	404	2.38	.967	.035
	More than 5 years	778	2.46	.973	
Indicator 6	1~5 years	404	1.98	.817	.029
	More than 5 years	778	1.98	.808	
Indicator 7	1~5 years	404	1.93	.783	.039
	More than 5 years	778	1.88	.776	
Indicator 8	1~5 years	404	1.98	.808	.029
	More than 5 years	778	1.95	.808	
Indicator 9	1~5 years	404	2.01	.848	.042
	More than 5 years	778	2.00	.847	
Indicator 10	1~5 years	404	1.95	.808	.028
	More than 5 years	778	1.89	.784	

3.2 Comparison of Teaching Behavior Changes of Teachers in E-book Environment under Different Application Time

Divide e-book application time into 0~2 semesters and more than 2 semesters. Statistics on the changes in teaching behaviors in the e-book bag environment for teachers who have been piloted for different application times are given in Table 4. It can be found that the average teaching value of the two-semester teacher teaching behavior in 2018 has been lower, indicating that as the application time increases, teachers find that the application and teaching behavior of e-books have a positive impact.

Table 5

Comparison of Teacher Behavior Changes in E-book Environment under Different Application Time

Application time		N	Mean	Standard deviation	Significant
Indicator 1	1~2 semester	433	2.13	.808	.039
	2 semester or more	749	1.90	.769	
Indicator 2	1~2 semester	433	2.09	.789	.028
	2 semester or more	749	1.89	.767	
Indicator 3	1~2 semester	433	2.10	.838	.040
	2 semester or more	749	1.89	.794	
Indicator 4	1~2 semester	433	2.11	.799	.038
	2 semester or more	749	1.90	.781	
Indicator 5	1~2 semester	433	2.46	.895	.043

	2 semester or more	749	2.41	1.013	
Indicator 6	1~2 semester	433	2.12	.821	.039
	2 semester or more	749	1.90	.793	
Indicator 7	1~2 semester	433	2.06	.800	.038
	2 semester or more	749	1.81	.750	
Indicator 8	1~2 semester	433	2.10	.828	.040
	2 semester or more	749	1.88	.786	
Indicator 9	1~2 semester	433	2.12	.860	.030
	2 semester or more	749	1.93	.832	
Indicator 10	1~2 semester	433	2.06	.820	.039
	2 semester or more	749	1.82	.762	

3.3 Three Years of Vertical Comparison

Table 6 investigates the three-year mean statistical data and finds that the average value of the effect of teachers' changes in teaching behavior in the e-bag environment in 2018 is lower than the previous average. This shows that in the past two years, teachers have found that the use of e-books has become less obvious in changing the teaching behavior of teachers.

Table 6

Three-year Longitudinal Change of Teachers' teaching Behavior in the Environment of E-books

Three-year vertical comparison		N	Mean	Standard deviation	S.E.Mean
Indicator 1	2016	729	4.078	.8125	.0301
	2017	1004	3.89	.856	.027
	2018	1182	1.98	.023	.790
Indicator 2	2016	729	4.125	.7946	.0294
	2017	1004	3.95	.884	.027
	2018	1182	1.96	.023	.782
Indicator 3	2016	729	4.041	.8007	.0297
	2017	1004	3.96	.828	.026
	2018	1182	1.96	.024	.817
Indicator 4	2016	729	4.001	.7992	.0296
	2017	1004	3.90	.833	.026
	2018	1182	1.98	.023	.794
Indicator 5	2016	729	3.513	1.0069	.0373
	2017	1004	3.51	.951	.030
	2018	1182	2.43	.028	.971

Indicator 6	2016	729	4.038	.8312	.0308
	2017	1004	3.88	.851	.027
	2018	1182	1.98	.024	.810
Indicator 7	2016	729	4.143	.7907	.0293
	2017	1004	4.01	.818	.026
	2018	1182	1.90	.023	.778
Indicator 8	2016	729	4.074	.8271	.0306
	2017	1004	3.92	.854	.027
	2018	1182	1.96	.023	.808
Indicator 9	2016	729	4.019	.8417	.0312
	2017	1004	3.87	871	.027
	2018	1182	2.00	.025	.847
Indicator 10	2016	729	4.169	.7968	.0295
	2017	1004	4.01	.827	.026
	2018	1182	1.91	.023	.792

4. Summary and outlook

4.1 Under the Environment of E-books, the Teaching Behaviors of Teachers of Different Teaching Ages Changed Significantly, and the Teaching Behaviors of New Teachers Changed More Positively.

In the new century, the application of information technology to education and teaching is an inevitable requirement of the development of the times for education reform. In the e-book environment, teachers of different teaching ages realize that the use of e-books in the classroom can activate the classroom atmosphere, greatly motivate students' enthusiasm for learning, and promote the development of students' comprehensive quality; but for new teachers, Responsible for new things and dare to challenge, more effective in improving teaching behavior, and promoting e-books to serve the classroom.

4.2 The Teaching Behavior of Teachers with Long-term Application of E-books Shows a More Positive State.

In a certain period of time, the integration of e-bags and classroom teaching is inseparable from the practical experience of teachers. Compared with teachers who have long-term application of e-books and teachers who have short application time, the former has a higher sense of recognition of changes in teaching behavior in the e-book environment. which indicates that as time goes by, teachers are increasingly discovering e-book applications. And the teaching behavior has a constant positive impact.

4.3 Three-year Vertical Comparison Found that Teachers' use of E-books is Gradually Reducing the Changes in Teachers' teaching Behavior.

With the passage of time, the development of e-books is relatively mature, but it has also entered a bottleneck period. On the whole, teachers have formed a certain pattern in the use of e-books, which has made the use of e-books less effective in changing the teaching behavior of teachers. This status quo is one of the breakthrough points in the current development of e-books.

All in all, e-books continue to advance in controversy, and with the rapid development of ubiquitous technology and learning analysis technology, it will bring new development opportunities for e-books. To this end, both teachers and managers must gradually promote the application of e-books in the classroom, and make new breakthroughs for their better service to the classroom.

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