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Empirical study on digital disaster education in China

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ABSTRACT

It is fair to say that the digital disaster education is becoming the basic part in the way we arrange our daily lives. In order to explore whether the situation of digital disaster education is ideal and impeccable for primary and secondary school, the paper performed a related survey from inner city neighborhoods to rural villages in selected places including Jiangxi, Zhejiang, Hebei, Shanxi, China, from February 2012 to January 2013. The authors disigned three kinds of different questionaires for more 1353 respondents including students, teachers and school administrators who were selected by random method. The basic principle of the logistic model is that the logistic regression analysis is a qualitative analysis of the variables on the dependent variable, and it is a non-linear model. The basic features of it are that the dependent variables must be dichotomous. The paper found that the disaster awareness of students and teachers are both dissonance with their ability to cope with disasters, and the attitude of school administrators is not that positive as the government expected which also verified that primary and secondary on digital disaster education is not ideal at present.

KEYWORDS

Digital disaster; Education; Primary and secondary school; Empirical study; China.

INTRODUCTION

As one of the countries that are affected frequently by the natural disasters in the world, the government of China and the public begin to pay more attention on digital disaster education, and the experts and scholars in China are encouraged to make researches on it to make people well prepared for disasters with the frequently occurred disasters recent years.. Especially after the Wenchuan earthquake in 2008, more experts and scholars begin to focus attention researches of the theme, and have achieved some success[1]. However, researches on primary and secondary school are in a low level contrast to digital disaster education on other groups.

Digital disaster education first introduced to the public of China was by two professors Wang Hong and Zongwen in the year 1996, but they were failed to give a definition of its concept. Even now, there is no a unified and standard definition of digital disaster education in China, but we can get a understanding of it by reading papers on the theme of scholars in and out of China. When we come to digital disaster education, we can use disaster prevention education, disaster prevention and mitigation education to retrieve papers on the theme[2,3], except for digital disaster education. A definition widely accepted but not standard on digital disaster education by many researchers in China is given by professor Ying Zhang, whose papers quantity on the theme ranked the first retrieved through CNKI using digital disaster education as subject term. It is defined as education on improving citizens' awareness and ability to cope with disasters to achieve the purpose of disaster prevention and mitigation[4], and to make them be able to protect themselves from disasters by using knowledge and skills on disasters[5]. So we usually regard digital disaster education as education helps people to grasp the knowledge and skills on disasters, improves the disaster awareness and literacy of the public[6-10].

From the papers retrieved through CNKI by using "digital disaster education" as subject term, there are less papers on primary and secondary digital disaster education. The paper analyzed the documents on the theme, and got a conclusion that the practical situation of digital disaster education on those students is below the level it should be. As the main point on these papers are that the situation of primary and secondary school on digital disaster education in China is positive, we did an fact-finding research to verify the viewpoint. From the data collected, the paper analyzed the awareness and ability of the respondents and got a conclusion that the situation of digital disaster education for primary and secondary students is not that positive or ideal.

MATERIAL AND METHODS

Materials

The study was carried out in four provinces of China. The object of this investigation are in Jiangxi, Zhejiang, Hebei, Shanxi provinces where disasters like floods, freezing rain, earthquake and other disasters occurred frequently in recent years. For the research of primary and secondary school in these areas, three different questionnaires were designed for students, teachers and administrators, who were selected by random sampling method. It aims at finding out the attitude and ability to cope with disasters or attitude on digital disaster education of the respondents. The questions designed for the respondents are according to the guidance's government preplan on disasters and experts advices. The questionnaire survey for students focused on their knowledge, awareness and skills on disasters like "Do you how to do first aid" or "Do you know where the disaster prevention site is", while the one for teachers focused on their awareness or willing to digital disaster education, knowledge and skills on disasters like "Do you ever educate students on disasters", "Can you be able to do emergence treatment". The questionnaire for school administrators focused on their attitude on digital disaster education, like "Have your school deigned courses on disasters", "Have your school ever trained teachers on digital disaster education", and so on. Totally, 1800 questionnaires were given out, and 1353 effective questionnaires were collected. Besides, the paper analyzed the situation of digital disaster education on primary and secondary school in China from the empirical method.

Empirical method

The paper analyzed the data collected by using Excel software. The paper summarized the options in the questionnaire of the respondents, and mark the options reflect cognitive or responding to disasters correctly as "Yes", mark the options reflects does not cognitive or responding to disasters incorrectly as "no", which included answers like "I don't know", "know a little" or "not important". The paper divided the students or teachers knowledge or skills on disasters into positive and negative aspects, by using the two conditions. If the slopes of two variables are opposite to each other, it means these two variables have different characters and qualities when using Excel to make a line chart of variables.

To further dining the data and to find out whether the items or variables contribute to the respondents' awareness or ability of disasters, it becomes necessary to use logistic regression analysis method as the relationship of variables can be reflected from the formulation got from the analysis. The basic principle of the logistic model is that the logistic regression analysis is a qualitative analysis of the variables on the dependent variable, and it is a non-linear model. The basic features of it are that the dependent variables must be dichotomous. The mathematical formulations are shown as following:

$$y = \alpha + \Sigma \beta_j x_i \qquad\qquad\qquad (1)$$

$$\text{logit}(P) = \text{In } P/(1-P) = y \qquad\qquad\qquad (2)$$

Where xi means the explanatory variables and y is a linear combination function of xi, and P is the probability of the occurrence. Parameters βj represent the regression coefficients to be estimated, which contributed to the probability value of P, while α is a constant. The paper used the model to describe the relationship between the variables and the respondents' knowledge or willing on disasters. As to the variables reflected respondents' knowledge or willing on disasters, we grasp the answers of the variables of two kinds: the answers like "know more" and "very clear" assigned to 1, which means a positive grasp of the situation the variables represent for ; the answers of "do not know" and "know little" assigned 0, which means the negative grasp of the situation the variables represented.

RESULTS

Using the methods above, the paper analyzed the data collected and got results as follows. The results are presented by three aspects: the students', the teachers' and the school administrators'.

The results of the students from the empirical method

In the investigation to students, we select prepare relief supplies for disasters, necessary to learn knowledge and skills coping with disasters, necessary to design digital disaster education course disasters, disasters related to human behavior, know where the disaster prevention site is, and have learned about disasters as variables reflecting students' willing to learn about disasters; select able to cope with emergencies, able to use relief supplies for disasters, and able to do first aid as variables reflecting students' awareness and knowledge on disasters.

To simplify the analysis, variables have negative slopes were put in group 1, and variables have positive slopes in group 2. From the analysis of variables in the two groups, a fact was found that the variables in group 1 are variables which stand for students' willing to learn about disasters, while that in group 2 are variables reflect students' awareness and knowledge on disasters. As the slopes of group 1 and 2 are opposite, the conclusion came out as that the students are willing to learn about disasters but their awareness or practical grasp of knowledge on disasters is unfavorable or quite alarming as they live in disaster-prone areas.

In order to find out how students' age, gender, address and education make a contribution to their ability to cope with disasters, the dependent variable is assigned to students' ability to cope with disasters, and the independent variables are age, gender, address and education by using SPSS 20.0 software to do logistic regression analyze. The output from SPSS is shown as TABLE 1.

TABLE 1 : Variables in the equation

		B	S.E,	Wals	df	Sig.	Exp (B)
Step 1a	Gender(1)	.267	.150	3.150	1	.076	1.306
	Age			26.885	3	.000	
	Age(1)	-.576	.783	.541	1	.462	.562
	Age(2)	-.185	.365	.259	1	.611	.831
	Age(3)	-1.198	.347	11.907	1	.001	.302
	Education			1.572	2	.456	
	Education(1)	-.894	.718	1.549	1	.213	.409
	Education(2)	-.044	.228	.037	1	.848	.957
	Address(1)	.584	.162	12.986	1	.000	1.794
	Constant	.178	.337	.280	1	.597	1.195

As it can be seen from TABLE 1 that the P value is 0.545 which much more bigger than 0.05, thus the goodness of fit is not perfect. But it has little effect on relative relationship of students' personal characteristics and attributes with their ability to cope with disasters as it can be seen from TABLE 2 in column EXp(B) which stand for the relative relationship of the variables with their references.

From information above we can get to know that:

Girls' ability to cope with disasters is 1.306 times higher than boys.

Students' age(1) (under 14 years old) is 0.576 times lower than students age(4) (beyond 18years old); Students' age(2) is 0.831 times lower than students age(4) (beyond 18years old);Students' age(3) is 0.302 times lower than students age(4) (beyond 18years old).Thus, the eldest students age(4),the reference variable, have the strongest ability to cope with disasters.

Similarly we can see that senior middle school students,the reference class, have the strongest ability to cope with disasters while the primary school students is the weakest, only 0.406 times of the senior, the junior middle school students' ability is almost the same with the senior, 0.957 times as the reference students

From the analysis above, the paper came to an conclusion that the students' awareness or willing and their knowledge or ability of disasters prevention are of dissonance that their ability or knowledge on disasters are lower their than their willing to learn about disasters, thus the schools should pay more attention on practical part to guide students on disasters prevention relevant skills.

The results of the teachers from the empirical method

To the survey on teachers, we select educate students on disasters, necessary to design digital disaster education course, have disaster relief supplies as variables reflect teachers' attitude on digital disaster education; able to do emergency treatment, able to use extinguishers as variables reflect teachers' ability or knowledge to cope with disasters.

Similar to the analysis of students, variables have negative slopes were assigned to group A, and variables have positive slopes assigned to group B. From the analysis of variables in the two groups, a similar fact was found out that variables in group A are variables stand for teachers' attitude on digital disaster education, while that in B are variables reflect teachers' ability or knowledge cope with disasters. As the slopes of group A and B are opposite, the conclusion is that the teacher's attitude on digital disaster education is positive, but their awareness or practical grasp of knowledge on disasters is unfavorable, similar to that of students, which reflects the situation of these schools' digital disaster education is alarming. The conclusion is in accord with the students' actual ability to cope with disasters and it also in accord with the phenomenon of examination-oriented education system in China that teachers put more efforts on "entrance rate to higher school" of students which is our fact-finding theme in future study.

In order to find out how teachers' gender, age, address and education make a contribution to their knowledge or awareness on disaster, the dependent variable is assigned to teachers' knowledge or awareness on disasters, and the independent variables are gender, age, address and education by using SPSS 20 to do logistic regression analyze. The output from SPSS is shown as TABLE 2.

TABLE 2 : Variables in the equation

		B	S.E	Wals	df	Sig.	Exp (B)
Step 1	Gender(1)	-.366	.341	1.152	1	.283	.693
	Age			5.315	3	.150	
	Age(1)	-.109	.607	.032	1	.857	.896
	Age(2)	.859	.630	1.859	1	.173	2.360
	Age(3)	.542	.583	.865	1	.352	1.720
	Education			3.391	2	.183	
	Education(1)	-.877	1.119	.614	1	.433	.416
	Education(2)	-1.466	1.076	1.856	1	.173	.231
	Address(1)	-.996	.404	6.080	1	.014	.370
	Constant	3.250	1.193	7.420	1	.006	25.790

As it can be seen from table 3 that the P value is 0.073 which a little bigger than 0.05, thus the goodness of fit is quite better than that of students. As it has little effect on relative relationship of teachers' personal characteristics and attributes with their ability to cope with disasters, the mathematical expressions can be got according to column EXp(B) in TABLE 4 which shows the relative relationship of the variables with their references.

From information above we can get to know that:

Teachers of age(1)(under 30 years old) have lower knowledge or awareness on disasters compared with the teachers old than 50, but teachers between 30-50 have the strongest ability than the eldest.

Teachers of education degree(1)(under or equal to college) have a lower a knowledge or awareness on disasters, 0.416 times lower than the reference education degree(equal or higher than postgraduate degree)

Teachers of education degree(2)(undergraduate degree) have a lower knowledge or awareness on disasters, 0.231 times lower than the reference education degree.

Teachers of education address(1)(teaching in countryside) have a lower knowledge or awareness on disasters, 0.370 times lower than the reference education degree.

From the analysis above, we can be seen that teachers have a positive attitude on digital disaster education but their awareness and ability on disasters are different with their different personal characteristics and attributes. As to the knowledge or awareness on disasters of teachers, the conclusion is that it is necessary to improve the teachers knowledge and awareness on disasters especially the old ones. What's more, it proved that the situation of primary and secondary school is not as positive as it described in some documents, and more attention should be paid to improve the current situation.

The results of the school administrators from the empirical method

To digital disaster education survey on Administrators, we select designed course on disasters, response to the guidance's from the government preplan on disasters, satisfy to the students, ability to cope with disasters, training teachers

on digital disaster education, organized students with escape drills, worked with students and their family to perform digital disaster education as variables reflect education manager' attitude on digital disaster education.

We can see that the slopes these variables are of dissonance, which should be consonance. Concerned with the researches on teachers and students, as well as the analysis we did above, we doubt the credibility of the answers given by the school administrators'.

The results of school administrators from logistic regression method

In order to find out how education' post, workplace, education make a contribution to their attitude on digital disaster education, the variable description is shown as TABLE 8, the dependent variable is assigned to teachers' knowledge or awareness on disasters, and the independent variables are gender, age, address and education by using SPSS 20 to do logistic regression analyze. The output from SPSS is shown as TABLE 3.

TABLE 3 : Variables in the equation

		B	S.E,	Wals	df	Sig.	Exp (B)
tep 1a	Workplace			1.235	2	.539	
	Workplace(1)	.238	.506	.221	1	.638	1.269
	Workplace(2)	.540	.491	1.211	1	.271	1.716
	Post			4.087	3	.252	
	Post(1)	.963	.499	3.734	1	.053	2.621
	Post(2)	.783	.615	1.618	1	.203	2.188
	Post(3)	.404	.494	.669	1	.413	1.498
	Education			5.452	3	.142	
	Education(1)	.470	.653	.000	1	.999	.174
	Education(2)	-1.385	.593	5.448	1	.020	.250
	Education(3)	-.427	.498	.736	1	.391	.652
	Constant	.880	.450	3.832	1	.050	2.411

Similar to the analysis of students and teachers, we can find out the mathematic relationship of the variables according to the Exp (B) in TABLE 5, and the results is shown as following :

The higher the administrators' education degree are,the higher possibility their attitude on digital disaster education are positive.

The higher the administrators' post are, the lower self satisfy on digital disaster education.

The attitude of administrators of the primary and secondary schools are positive to that of the senior middle school, which consistent with the examination-oriented education system in China, as the senior middle school students are faced with the national entrance examination.

From the analysis above, the conclusion is that more efforts should be paid on changing the administrators' attitude on digital disaster education, especially on middle school administrators, which will have connection with the reformation of examination-oriented education system in China.

Improvement strategies according to the research

From the analysis of the data collected, we find out that the disaster awareness of students and teachers are both dissonance with their ability to cope with disasters, and the attitude of school administrators is not that positive as the government expected which also verified the viewpoint that the situation of primary and secondary on digital disaster education is not ideal, thus more attention should be paid on the issue to improve their quality to cope with disasters which will help them a lot as they lived in the disaster-prone areas. That is more efforts should be paid on digital disaster education of primary and secondary schools especially according to the personal characteristics of students, teachers and school administrators as it make a contribute to their awareness, ability or attitude to digital disaster education according to the research.

As the empirical analysis of the respondents shows that their personal characteristics and attributes make a contribution to their awareness and ability on digital disaster education, the efforts should be made based on these factors. For example, design different education forms on digital disaster education on for students of different age and gender to improve their interests on it which will help them more familiar with measures to cope with different kinds of disasters.

As to school administrators, they should change their attitude on disaster education and strengthen their piratical participation on digital disaster education. For example, school administrators should pay more attention on teachers' ability and awareness on disasters, and train them on how to improve their quality on digital disaster education based on their characteristics and ask the teachers to submit a teaching plan of students on digital disaster education according to different characteristics. And schools should select the successful cases on digital disaster education as typical cases for the following

digital disaster education to form a long-term digital disaster education in the end, which will make a contribution to improve the situation of digital disaster education of the schools. As to teachers, they should make a improvement according to their own weakness and educate their students based on the students' own characteristics and interests.

CONCLUSIONS

The paper analyzed the situation of primary and secondary school on digital disaster education through empirical method, and verified the viewpoint that the situation isn't that positive as some other papers claimed, and from the empirical analysis the paper found out that the personal characteristics and attributes of students, teachers and school administrators make a contribution to their awareness and ability on digital disaster education which helps to make improvement strategies for digital disaster education. Based on the analysis of the fact-finding research, the paper paper proposed some advices to improve the situation of digital disaster education on primary and secondary school. Finally, the situation of digital disaster education on primary and secondary school will be changed and improved through the effective communication and collaboration of all relevant groups.

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