Research on the Effect of Learner Characteristics on Postgraduate Online Learning

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Abstract. In the era of digital education, online learning, as one of the most commonly used learning methods for postgraduate students, has a great impact on the publication of research results of postgraduate students. There is only a lack of attention to this topic in the literature. The results of a questionnaire survey of 462 graduate students in the article show that individual learning behavior has the most significant impact on the online learning effect of graduate students, followed by learning input, while learning motivation has no significant impact on the online learning effect of graduate students. According to the specific data of learning behavior and learning input. The ability of postgraduate students to access, integrate and formulate clear learning plans for online learning needs to be improved.

Keyword: Postgraduate · Online learning · Informatization capability

1 Foreword

Internet plus education, the transformation of digital education, Chat GPT… All reflect the rapid development of big data and the information age. The speed of knowledge updating is getting faster and faster, and the learning methods are also changing. As a way to quickly approach the latest knowledge, online learning is a learning method that graduate students have to master. But online learning also has problems such as information overload and information loss [1]. In addition, relevant research focuses more on online teaching strategies, challenges faced by teachers, experience summary, etc. [2], and less on graduate students. As the main force of scientific and technological innovation after receiving higher education and the core force of the future development of knowledge society, graduate students explore the individual factors that affect their online learning effect, which is of positive significance for promoting effective online learning of graduate students and promoting the transformation of digital education [3], In addition, this study is concerned about the impact of graduate students' own characteristics in online learning on online learning effect, so as to provide some reference for the study of strategies to improve online learning effect.

Table 1. Reliability Statistics

Clone Bach Alpha	Cloning Bach Alpha based on standardized terms	Numbers
0.952	0.952	12

Table 2. KMO and Bartlett Inspection

KMO sampling suitability quantity		0.951
	Approximate chi-square	4632.380
Bartlett sphericity test	free degree	66
	conspicuousness	0.000

2   Data Source and Analysis

This study explores the impact of learner characteristics on graduate students' online learning from three dimensions: learning motivation, learning engagement and learning behavior. SPSS25.0 was used to analyze the reliability and validity of 462 valid questionnaires. The Cronbach's alpha coefficient is used for reliability test in this questionnaire. The analysis results are shown in Table 1. The coefficient of Clonbach Alpha is 0.952 and greater than 0.8, indicating that the reliability of the questionnaire has good internal consistency and good reliability.

KMO and Bartlett test were used to analyze the internal consistency of the validity of the questionnaire. As shown in Table 2, the measured value of KMO was $0.951 > 0.7$ and $p < 0.05$ had significant difference. The structural validity of the questionnaire was very good.

According to the overall analysis of the data of learners' personality characteristics, as shown in Fig. 1, it can be found that learners' own characteristics have a positive impact on learning results in online learning, of which learning input is the best. However, in online learning, some graduate students believe that they have not made a clear learning plan and lack the ability to access and integrate information.

3   Research Results

3.1   Correlation Analysis

A bivariate correlation analysis of individual learning motivation, learning engagement and learning behavior of the sample (Table 3) shows that there is a different degree of correlation between different influencing factors of graduate students' online learning effect, and there is a significant positive correlation between learning motivation, learning engagement, learning behavior and learning effect, The order of correlation coefficient is learning behavior ($r = 0.795$) > learning engagement ($r = 0.767$) > learning motivation ($r = 0.614$), indicating that the stronger the graduate student's learning motivation, the better the learning engagement and learning behavior, and the better the online learning effect.
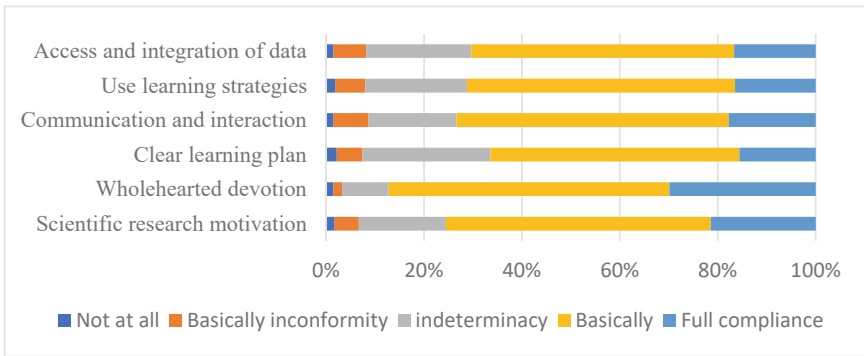
Fig. 1. Overall analysis of learner characteristics

Table 3. Correlation between factors influencing learning effect

	Learning motivation	Learning engagement	Learning behavior	learning effect
Learning motivation	1			
Learning engagement	.684[**]	1		
Learning behavior	.662[**]	.811[**]	1	
learning effect	.614[**]	.767[**]	.795[**]	1

[**]At 0.01 level (double tail), the correlation is significant.

3.2 Regression Analysis

In order to explore the impact of different dimensions of online learning learners' characteristics on learning outcomes of postgraduate students, this survey uses multiple linear regression model for analysis, and its regression model is shown in Table 4. Explain the essential relationship of each factor. First, learning motivation, learning input and learning behavior are the control variables, and learning effect is the dependent variable. A regression model is established to explain the linear relationship between the independent variable and the dependent variable, and whether the variance of the overall explanatory variable reaches the statistical significance level.

From Table 4, it can be seen that the significance of learning input X1 and learning behavior X2 are both less than 0.05. The regression equation of online learning effect y of postgraduate students can be obtained as follows:

$$y = 0.406 + 0.344x_1 + 0.466x_2 \tag{1}$$

regression coefficient B shows the degree of influence between them. The VIF value of the model fitting is analyzed (VIF < 5). The model does not have collinearity problems,

Table 4. Linear regression model

classification	Unstandardized coefficient		Standardizactation coefficient	t	Conspicuousness	Collinearity statistics	
	B	Standard error	Beta			tolerance	VIF
(constant)	0.406	0.114		3.572	0.000		
Learning motivation	0.062	0.033	0.070	1.856	0.064	0.499	2.004
Learning engagement	0.344	0.051	0.326	6.793	0.000	0.304	3.288
Learning behavior	0.466	0.045	0.485	10.360	0.000	0.321	3.118

and the model fitting is good. And through the normal P-P diagram test of the regression standardized residual, we can conclude that the residual is subject to normal distribution, which proves that our regression model of online learning effect is accurate and reliable. It can be concluded that learning engagement and learning behavior have a significant positive impact on learning effect, of which learning behavior is the most significant. Improving graduate students' learning behavior is the key to improve online learning effect.

4   Conclusion

1. There is no significant difference in the impact of individual learning motivation on the online learning effect of graduate students, that is, whether for scientific research needs or hobbies, the online learning effect of graduate students will not be significantly different due to different learning motivation.
2. Individual learning behavior has a significant impact on the online learning effect of graduate students. Compared with learning input, the former has a greater impact on online learning effect
3. In the dimension of individual learning behavior and individual learning input, the ability of postgraduate students to access and integrate data and clearly formulate learning plans needs to be improved.

Therefore, in the follow-up online education research, we can start from the individual online learning behavior and learning input to improve the effect of graduate online learning. For example, we can help students master the information-based ability of consulting, processing and integrating materials by offering relevant general elective courses, which is an indispensable ability to carry out online learning [4]. The online learning platform can carry out knowledge competitions, encourage students to participate in online learning, create a learning atmosphere, and let learners maintain the state and habit of independent and continuous learning [5], so as to maximize the value of online education resources.

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