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A Research on the Effect of Learner attribution on Performance under the mediation of online learning environment

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Abstract: *Online learners' learning attribution has a significant effect on their learning behavior motivation and other psychological characteristics, and effects their learning performance through the change of learning behavior. The focus of this research is: What changes the learning behavior of online learners during the intermediate process? How does its mode of action relate to online learners' learning attribution? This research adopts the method of the role of mediating variable and takes online learning environment as the intermediary variable to test the direct effect of learning attribution on learning performance and the indirect effect through the mediating effect of online learning environment, and the regression model generated by the mediating effect analysis predicts learning performance. The results show that luck attribution has no effect on learning performance. Ability attribution, effort attribution and background attribution have no direct effect on learning performance. However, some indirect effects can be generated through the mediating effect of online learning environment, among which the total effort attribution has significant indirect effects through the pedagogy of online learning environment. Overall background attributions, ability and effort attributions in success attributions, and background attributions in failure attributions have significant indirect effects through the pedagogy, technology, and community mediating effects of online learning environments. All of the above indirect effects can positively predict learning performance, which provides a guiding ideology with practical significance for the construction elements of online learning environment.*

Keywords: online learner, achievement attribution, performance, online learning environment, mediate, mediating variable, direct effect, indirect effect

Introduction

Bernard Weiner (Weiner 1986) pointed out that people's future behavior is partially determined by the observable causes of previous results. This view can be understood as Weiner's most simplified description of attribution. When people are aware of the cause of the previous results, they always try to adjust their behavior, which will lead to different results. Several subsequent researches on learning attribution suggest that the significant effect of learning attribution on learning motivation, learning expectation and psychological characteristics, which is transmitted to learners' achievement behavior and ultimately effects their learning performance (Pokay & Blumenfield, 1990; Sui, 1991; Liao, 1993). At the same time, many researches have shown that the learning environment has also a significant effect on the achievement behavior of the students (Zhang,

2004; Steven, 2000), which can improve the learning performance. It is obvious that learning attribution is about the attributes of the subject, while the learning environment is the attributes of the object. Some researches on learning performance with learning attribution as independent variable lack of environmental influence, while the study of learning environment as independent variable ignores subjectivity. What is the theoretical model of learning attribution and learning environment, especially online learning environment, that together effect learning performance? What are the ways and rules of effect? Are directly or indirectly? And furtherly clarify the relation of the structural elements between learning attribution and learning environment. These are the logical starting points of this research.

literature review

In 1958, Heider explained the motivation theory from the perspective of cognition in "The Psychology of Interpersonal Relations" (1958), At the same time, attribution was defined plainly: that everyone tries to understand the causes and effects of his or her own and others' behaviors in daily social life, that is, seek for the causes of various behaviors (Lin, 1989). Thus the attribution theory was established. On the basis of Heider's attribution theory and Atkinson's achievement motivation theory, in order to find the basic motivation of behavior, Weiner examined perceived causal characteristics that affect the outcome (success or failure) of a behavior, causal structure, the relationship between causal characteristics and emotion, the stimulating effect of emotional response, the implications of other people's emotional responses and so on (Weiner, 1985; Hall &Hines & Bacon; Koulianos, 1992). It is pointed out that attribution will lead to changes in learners' expectations of their own behavior results, and at the same time, it will cause learners to have emotional responses, which will effect learners' behaviors and effects.

In the following decades, Weiner 's attribution theory, starting from the process of individual attribution, explores the relationship between individual attribution of success or failure and achievement behavior, and has been widely used to explore its effect on learning motivation, achievement behavior and academic performance. For example, it is proved that learning strategy, as a means of learning, has an important impact on students' academic performance (Liu & Guo, 1993; Zimmerman & Martinez-Pons, 1990). Some researchers explore the correlation and model of learning self-efficacy, achievement motivation, learning strategy and academic achievement (Zhou, Zhang, Li & Liu, 1997). In these studies, correlation method and factor analysis method are adopted to analyze the different characteristics of causes, and many causes are finally classified into three dimensions according to their characteristics, namely, control source (individual internal - external environment), stability (stability-instability) and controllability (individual controllable - individual uncontrollable). Different attributional patterns will lead to different emotional and behavioral responses and effect the prediction of subsequent behaviors. The MMCS (The Multiattributional Causality Scale) formed under this theory is to analyze learners' attributional styles from four dimensions of ability, effort, background and luck.

During this period, it was also pointed out that a lot of research on tended to single explore the impact of learning attribution or learning strategy on learning behavior and academic performance (Yang, 1987; Shi, 1991). From these studies, it is usually not

clear whether learning attribution has a direct impact on learning behavior or academic performance, as well as its effect weight. Some researches conclusions show that: learning attribution has no significant effect on academic performance, and it is difficult to link it with teaching practice. It is speculated that this is probably because it is separated from the social component, environmental effect and group background of the learning affecting factors (Zhou, Dong, 1994).

As the research focus of attribution theory gradually shifts from the attribution process to the attribution effect, the discussion of various affecting factors and the relationship of action becomes the spotlight. Accordingly, the research on achievement motivation begins to focus on the control source, controllability, emotional response, responsibility inference and responsibility behavior of attribution. It is also found that attributional control source, stability and controllability effect responsible behavior by affecting emotional response. Research on interpersonal communication also shows that behavioral cause control, emotional response and responsibility inference are significantly correlated, and have a significant impact on the willingness to help. The role of interpersonal affecting factors in the learning environment has a significant effect on the emotional response and interactive behavior formed by different learning attribution (Xing, Yao, 2009; Liu, 2002; Sui, 2005).

At the same time, due to the appearance of online learning in the digital environment, the interaction between learner success and failure attribution on learning behavior and learning performance has become a hot topic. Online learning conditions provide learners with cognitive function, analysis function, knowledge construction function, knowledge expansion function, interaction function, collaborative learning function, self-assessment function, etc. (Mioduser, Nachmias, Lahav, Avigail, 2000; Mioduser, Nachmias, Oren, Lahav, 1999; Zabel, Linroth & Fairman, 2010), enables learners to directly obtain the support and training of self-efficacy, cognition, effort, diversity, suitability and other strategies. For learners with different learning attributions, how will these support and training effect their learning performance? The trilateral relationship between learners' attribution of success or failure, characteristics of online learning environment and learning performance has become the most concerned topic.

It can be seen that the attribution orientation of online learners to learning performance has become one of the core elements to be considered in the construction of online learning environment. Some researches on online learning show that positive learners are more inclined to internal control attribution (Zhong, Zhao, 2006). Therefore, the design and evaluation criteria of online learning environment aiming at the diversity and effectiveness of learning activities have become the mainstream design ideas (Zhang, 2004; Xu, 2003). For example, learning evaluation model proposes that the establishment of virtual learning environment should have: control interaction, interaction activities, interaction space and interaction members. Oren et al. explained that the control of interactivity and interaction space is a technology orientation, while interaction activities and members are community orientation. On the basis of refining the technology and community, the pedagogy concept is supplemented, and the three dimensions of learning evaluation model are constructed: community, technology and pedagogy (Oren etc., 2006), as shown in Figure 1. The contents of the three dimensions are as follows:

Community dimensions: sense of belonging, existent of presence, status definitions;
Technology dimensions: immersivity, multi-user options, communication means, meta-level features;
Pedagogy dimensions: hyperlink-curriculum, collaborative learning, virtual/classroom relationships, educator's function, interactions.
Oren et al. also used the Learnet model to analyze and evaluate multiple e-learning communities to test the completeness and effectiveness of the model.

Based on the learnet model, the Institute of knowledge science and engineering of Beijing Normal University has developed an online learning environment measurement scale, and has carried out the measurement of online learners in the Institute of online education. The scale includes: measuring learners' evaluation of online learning environment in community, technology and pedagogy aspects, measuring learners' attribution, and measuring learners' learning performance.

		variables	0	1	2	3
Dimensions	community	Sense of belonging	none	class registration	personal registration	developer/ contributor
		Extent of presence	none	occasional	within a course	daily
		Status definitions	none	predefined	guests' rights	full members' rights and duties
	Technology	Immersivity	text-based	2D graphics	2 1/2D graphics	virtual reality-3D graphics
		Multi-user options	none	—	—	collaborative work
		Communication means	none	e-mail	asynchronous	synchronous
		Meta-level features	no	—	—	yes
	pedagogy	Hyper-curriculum	book	internal links	external links	web structure
		Collaborative learning	none	collaborative work in class-room	collaborative work between schools	collaborative work with peers
		Virtual/classroom relationship	mainly class-room activity	virtual/ class room complement	information retrieval projects	mainly virtual activities
		Educator's function	class-room teacher	experts	virtual tutors _ classroom teacher	virtual tutors
		Interactions	browsing	activation and observation	question answering	telem-mani-pulation/java/ vrml

Figure 1 Learnet evaluation model variable scale (Oren etc., 2006)

Research Design

Under the online learning environment, whether learners' learning attribution has effect on learning performance, directly or indirectly through the learning environment. If it is through the mediating effect of the learning environment, and in what way. This is the most interesting question in this research.

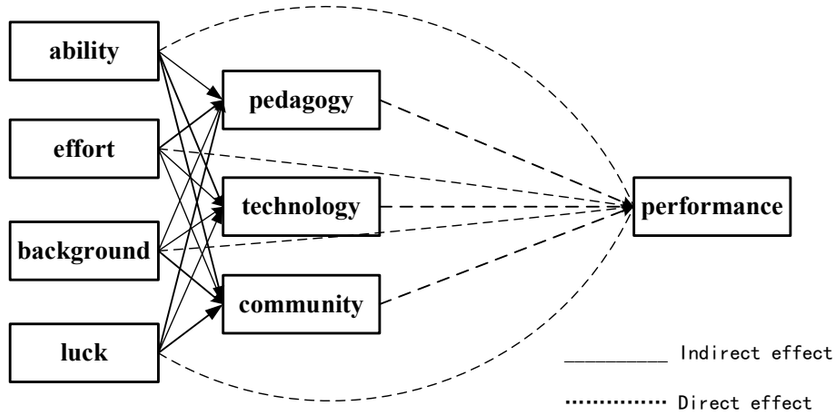

Figure 2 learning attribution has effect on learning performance, directly or indirectly through the learning environment

(1) The experimental hypotheses of this research

First of all, it is necessary to clarify whether there is a correlation between online learners' learning attribution, online learning environment and learning performance. If the correlation exists, we can further study the interaction between them and the mode of action.

Hypothesis 1: the learning attribution of online learners is significantly related to their learning performance;

Hypothesis 2: online learning environment is significantly related to learners' learning performance;

Hypothesis 3: learning attribution of online learners is significantly related to online learning environment.

This paper further discusses whether the relationship between learners' learning attribution and learning performance directly effects the relationship or indirectly through the mediating effect of online learning environment.

Hypothesis 4: the direct effect of online learners' learning attribution on learning performance is significant;

If Hypothesis 4 is rejected, we can further explore:

Hypothesis 5: learning attribution of online learners indirectly effects learning performance through the mediating effect of online learning environment.

(2) The validity and reliability of the subjects and scales in this research

The research randomly selected 250 online learners from the online education learning centers of J University in Tianjin, Shenzhen in Guangdong, Guilin in Guangxi and Zhaotong in Yunnan. 239 questionnaires were collected, of which 208 were valid, with the recovery rate of 95.6% and the effective rate of 83.2%. Boys accounted for 36.5% of the subjects, while girls accounted for 56.7%. The average age was 29.31 years old, ranging from 20 to 50 years old. Grade 1-3, major involves Chinese language and literature, mathematics and other nine majors.

a. Measurement of online learning environment

The online learning environment measurement and evaluation scale (Liang, Peng, Wang, Huang, Chen, 2007) was used as the measurement. It is a Likert 5-point scale. Through structural validity analysis, the variables with load less than 0.4 or higher and similar load in more than two factors were deleted. Table 1 is obtained.

Table 1 Online learning environment evaluation measurement

Dimension	No.	Topic overview
Pedagogy	1	The course learning requirements put forward clearly.
	2	The learning materials related to the course are clearly listed.
	3	The contents of the syllabus are clearly provided.
	4	The time limit for handing in homework is clearly defined.
	5	The course activity plan is detailed and reasonable.
	6	The description of the course content is clear and clear.
	7	Sufficient and abundant curriculum resources (such as previous examination papers, teachers' teaching plans, etc.).
	8	The course materials are suitable for self-study.
	9	Homework questions help to deepen understanding.
	10	Allow to view homework and exam scores.
	11	Teachers can give feedback on homework in time.
	12	I often do online testing provided on the platform.
Tehnology	13	Friendly and convenient learning interface.
	14	Learning materials are instant and convenient.

Table 1 Online learning environment evaluation measurement

Tehnology	15	Fast and effective network links.
	16	The operation function is complete and reasonable.
	17	Communication tools facilitate interaction (e.g. forum, web QQ, chat room, etc.).
	18	"Digital Library" is very useful.
	19	The shared space is easy to obtain the learning materials provided by students.
	20	Bulletin board provides instant course information.
	21	Get help with software operation in real time.
	22	Get technical help for platform operation in real time (such as downloading plug-ins, uploading files, etc.).
	23	Provide FAQs about network technology.
Community	40	In the learning activities, I got a good friendship with my classmates.
	42	I got help from other students in the learning activities.
	43	Very willing to participate in peer learning, discussion and communication.
	45	Highly recognize and trust the course tutor.
	47	In case of difficulties, one can get help from tutors or classmates.
	48	I seek help from tutors or classmates often, besides learning difficulties.

SPSS 22.0 was used for KMO and Bartlett tests, as shown in Table 2. The results show that the data support factor analysis to test the validity of the structure.

Table 2 KMO and Bartlett tests for sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		8.49
Bartlett's Test of Sphericity	Approx. Chi-Square	1913.66713
	df	406
	Sig.	0.000

The AMOS V21.0 structural equation model SEM was used for confirmatory factor analysis to evaluate the structural validity of measurement.

As Table 3 shows, X^2(Chi-Square)/df =2.307, indicating that the consistency between the sample covariance matrix and the expected covariance matrix is relatively high (2-5 indicates that the model is acceptable, the smaller the similarity is, the better the model fitting is). NFI (normed fit index), IFI (incremental fit index), TLI (Tucker Lewis index) and CFI (comparative fit index) are closer to 1, the better. RMSEA (Root Mean Square Error of Approximation) is acceptable as below 0.08. The above indexes indicate that the SEM model of online learning environment evaluation measurement has good structural validity.

Table 3 Online learning environment quality fitting index

Fitting index	X^2	DF	X^2/df	NFI	IFI	TLI	CFI	RMSEA
	862.993	374	2.307	0.657	0.772	0.726	0.765	0.079

The factor load matrix in Table 4 shows that the factor load of each topic is above 0.400, which conforms to the standard of factor analysis structural model. Confirmatory factor analysis finally produced three dimensions (factors): Community, Technology and Pedagogy

$F_{Pedagogy}$= 0.493*c1+0.409*c2+0.570*c3 +0.478*c4+0.633*c5+0.529*c6+0.568*c7+ 0.429*c8 +0.606*c9+0.578*c10+0.627*c11+ 0.480*c12

$F_{Technology}$= 0.560*c13+0.651*c14+0.45 3*c15+0.662*c16+0.497*c17+0.599*c18+ 0.611*c19+ 0.690*c20+0.732*c21+0.653*c22 +0.574*c23

$F_{Community}$= 0.416*c24 + 0.494*c25+0.595 *c26+0.674*c27+0.758*c28+0.488*c29

The reliability statistics Cronbach's alpha N of items is 0.911, which indicates that the consistency of online learning environment data is very high.

Table 4 Item factor load matrix of online learning environment questionna

pedagogy	load	technology	load	community	load
C1	0.493	C13	0.560	C24	0.416
C2	0.409	C14	0.651	C25	0.494
C3	0.570	C15	0.453	C26	0.595
C4	0.478	C16	0.662	C27	0.674
C5	0.633	C17	0.497	C28	0.758
C6	0.529	C18	0.599	C29	0.488
C7	0.568	C19	0.611		
C8	0.429	C20	0.690		
C9	0.606	C21	0.732		
C10	0.578	C22	0.653		
C11	0.627	C23	0.574		
C12	0.480				

b. Measurement of online learners' learning attribution

There are 24 variables of learning attribution (see Table 5) in the online learning environment measurement and evaluation questionnaire, including total attribution, success attribution and failure attribution. Each attribution is divided into four aspects: ability, effort, background and luck. It is also a Likert 5-point scale.

The reliability statistics Cronbach's alpha N of items is 0.890, which indicates that the consistency of attribution data is very high.

Table 5 Measurement of attribution of success or failure

No.	Attribution	Topic overview
1	Total attribution	Learning ability determines the level of achievement.
2		Study hard determines the level of achievement.
3		The standard of scoring determines the level of achievement.
4		Luck determines the level of achievement.
5		The level of achievement reflects the ability to learn.
6		The achievement level reflects the study hard or not.
7		The level of achievement reflect the ease of the course.
8		The level of achievement reflects luck.
9	Success attribution	I got good grades because I have strong learning ability.
10		I got good grades because I study very hard.
11		I got good grades because the course is very easy.
12		I got good grades because I was very lucky.
13		My learning ability is very strong, so I got good grades.
14		I studied very hard, so I got good grades.
15		I gave my tutor a good impression, so I got good grades.
16		I was very lucky, so I got good grades.
17	Failure attribution	My poor grades are due to my poor learning ability.
18		My poor grades are without hard work.
19		My poor grades are due to tutors bad lectures.
20		My poor grades are due to bad luck.
21		I really don't have the ability to learn this course well.
22		I didn't work hard on the course.
23		Tutors were too strict in marking papers.
24		I can't do anything well with bad luck.

c. Measurement of learning performance

The measurement of learning performance comes from two parts. One is the self-evaluation of 9 items of online learners' satisfaction with their own learning effect. It is a Likert 5-point scale. See Table 6. The total satisfaction is the average of the nine items of satisfaction

The reliability statistics Cronbach's alpha N of items is 0.858, which indicates that the consistency of learning performance satisfaction data is very high.

The other part is the average of the seven periodic exams. Since the two-part measurement itself is different and not comparable, it defines performance as the sum of two standard points (Z scores), which not only reflects the academic performance of online learners, but also reflects their relative position in the overall situation.

Table 6 Self-evaluation of online learners' satisfaction with learning performance

No.	Topic overview
1	More and more interested in the professional knowledge learned.
2	The ability to think has improved.
3	The ability to analyze and solve practical problems has been improved.
4	The ability to discuss and communicate with others has improved.
5	The ability to actively obtain information and learn independently has improved.
6	Have mastered the basic principles in the discipline deeply.
7	Have mastered the basic concepts and knowledge of the subject.
8	Have mastered the basic skills of the subject.
9	Have mastered the integration of knowledge

Research Results

The experiment is to explore the relationship between online learners' learning attribution, online learning environment and learning performance. If there is no significant correlation between the three, there is no direct and indirect impact completely.

(1) Correlation analysis of learning attribution, online learning environment and learning performance of Online Learners

a. The correlation analysis of online learners' learning attribution and learning performance:

The results of correlation analysis in table7 show that the ability, effort and background of learning attribution are positively correlated with learning performance, while luck has no correlation with learning performance. It indicates luck as the attribution of external uncontrollable instability, is not related to learning performance.

Table 7 Correlation matrix of learning attribution and learning performance

	Ability	Effort	Background	Luck
Learning performance	.193**	.191**	.168*	.063

b. The correlation analysis of online learning environment and learners' learning performance

The results of correlation analysis in Table 8. show that there is a significant positive correlation between pedagogy, technology, community and learning performance in online learning environment. It can be understood as that online learners' evaluation of online learning environment is positively correlated with learning performance.

Table 8 Correlation matrix of online learning environment and learning performance

	Pedagogy	Technology	Community
Learning performance	.346**	.330**	.337**

c. The correlation analysis between online learners' Attribution and online learning environment

Table 9 shows that there is a significant positive correlation between the ability, effort, background of learning attribution and the pedagogy, technology and community characteristics of online learning environment. This indicates that the attribution intensity of internal control and stability is significantly positively correlated with the perceived level of online learning environment. However, luck in learning attribution is related to the pedagogy and technology of online learning environment, but not to the community of online learning environment.

Table 9 Correlation matrix of learning attribution and learning performance

	Ability	Effort	Background	Luck
Pedagogy	.233**	.165*	.187**	.155*
Technology	.321**	.240**	.203**	.142*
Community	.265**	.226**	.189**	.117

To sum up, the correlation analysis among online learners' learning attribution, online learning environment and learning performance shows that luck attribution in learning attribution belongs to external uncontrollable and unstable attribution, and its attribution level is not related to learning performance level, so it cannot predict learning performance significantly and has no effect. The other attribution of learning attribution: ability, effort and background have significant positive correlation with online learning environment and learning performance. Thus, it constitutes the necessary condition of positive prediction.

Conclusion: In hypothesis 1, hypothesis 2 and hypothesis 3, all hypotheses are acceptable except that the hypothesis that luck attribution is significantly related to learning performance is rejected. On this basis, it is necessary to further analyze the effect of learning attribution ability, effort and background on learning performance.

(2) Analysis of the effect of online learners' learning attribution on learning performance

PROCESS Procedure for SPSS Release 2.16.3 was used to conduct the mediation effect test, and a regression model was generated to analyze the direct effect of online learners' learning attribution on learning performance and the indirect effect through online learning environment. This effect will predict learning performance.

a. An analysis of the direct and indirect effects of ability attribution on learning performance mediated by online learning environment

The results in table 10 show that the direct effects of total ability attribution, success ability attribution and failure ability attribution on learning performance are sig > 0.05, which are not significant.

Attribution of success ability and failure ability have significant indirect effects on learning performance through pedagogy, technology and community mediating effects of online learning environment. Among them, the most important mediating effect is community, which is 0.0702 * and 0.0696 * respectively. Pedagogy is the second, 0.0589 * and 0.0618 * respectively. The results in table 10 show that both the success attribution and the failure attribution have a significant indirect impact on learning performance through the mediation of online learning environment, forming a positive prediction. Of the three types of online learning environments, the mediating effect of community is the most significant, followed by pedagogy and technology. This is the learning community characteristics of online learning. Learning behaviors such as knowledge, skills, emotions, attitudes and learning strategies have a significant impact on learning performance.

Table 10 The direct and indirect effects of ability attribution on learning performance

DIRECT AND INDIRECT EFFECTS				
			Effect	Sig
Total ability attribution	Direct		0.1556	0.2481
	Indirect	Pedagogy	0.0850	0.0517
		Technology	0.0294	0.0685
		Community	0.0952	0.0620
		Total	0.2097	0.0576
Success ability attribution	Direct		0.0642	0.5514
	Indirect	Pedagogy	0.0589*	0.0373
		Technology	0.0257*	0.0473
		Community	0.0702*	0.0463
		Total	0.15480	0.0477
Failure ability attribution	Direct		0.1551	0.1794
	Indirect	Pedagogy	0.0618*	0.0373
		Technology	0.0215*	0.0473
		Community	0.0696*	0.0463
		Total	0.1529	0.0500

b. An analysis of the direct and indirect effects of effort attribution on learning performance mediated by online learning environment

Table 11 shows that the direct effects of total effort attribution, success effort attribution and failure effort attribution on learning performance are sig > 0.05, which are not significant.

Successful effort attribution and failure effort attribution have significant indirect effects on learning performance through the pedagogy, technology and community mediating effects of online learning environment. Among them, the most important mediating effect is still community, which is 0.0700 * and 0.0541 *, respectively. Pedagogy came next, 0.0503* and 0.0432*, respectively. This shows that learners with effort attribution orientation, whether successful or failure attribution, have a significant effect on learning performance through the mediating effect of online learning environment, forming a positive prediction. Of the three types of online learning environments, the mediating effect of community is the most significant, followed by pedagogy and technology.

Total effort attribution has a significant indirect effect on learning performance through the pedagogy mediating effect of online learning environment. Its contribution value cannot be ignored. This extra indirect effect was absent from total ability attributions, suggesting that the indirect effect of online learners' total effort attributions (regardless of success or failure) on learning performance was stronger than that of total ability attributions.

Table 11 The direct and indirect effects of effort attribution on learning performance

DIRECT AND INDIRECT EFFECTS				
			Effect	Sig
Total effort attribution	Direct		0.1818	0.1510
	Indirect	Pedagogy	0.0619*	0.0403
		Technology	0.0228	0.0546
		Community	0.0803	0.0549
		Total	0.1650	0.0572
Success effort attribution	Direct		0.1485	0.1653
	Indirect	Pedagogy	0.0503*	0.0334
		Technology	0.0191*	0.0471
		Community	0.0700*	0.0464
		Total	0.1394	0.0504
Failure effort attribution	Direct		0.1233	0.2741
	Indirect	Pedagogy	0.0432*	0.0308
		Technology	0.0185*	0.0373
		Community	0.0541*	0.0400
		Total	0.1159*	0.0449

c. An analysis of the direct and indirect effects of background attribution on learning performance mediated by online learning environment

The results in table 12 show that the direct effects of total background attribution, success background attribution and failure background attribution on learning performance are sig > 0.05, which are not significant.

Total background attribution and failure background attribution have a significant indirect effect on learning performance through the pedagogy, technology and community mediating effect of online learning environment, forming a positive prediction of learning performance. However, the attribution of successful background has a significant indirect effect on learning performance only through the mediating effect of technology factors in online learning environment.

The results can be summarized as: Since failure background attribution is attributed to the difficulty of the course, harsh grading, the bad relationship with teachers, the poor teaching of teachers and other external uncontrollable factors, all the properties of online learning environment can compensate for the above adverse factors (such as the positive correlation mentioned above), which will have a significant effect on their performance and form a positive prediction. However, the success background attribution is less dependent on the online learning environment, only sensitive to technology.

For online learners with external uncontrollable attribution orientation, the community effect is significant, which are 0.0632 * and 0.0446 *, respectively. It shows that the mediating effect of communication, interaction and cooperation in learning environment is significant.

Table 12 The direct and indirect effects of background attribution on learning performance

DIRECT AND INDIRECT EFFECTS				
			Effect	Sig
Total background attribution	Direct		0.1490	0.2069
	Indirect	Pedagogy	0.0569*	0.0433
		Technology	0.0217*	0.0411
		Community	0.0632*	0.0447
		Total	0.1418	0.0473
Success background attribution	Direct		0.1522	0.3039
	Indirect	Pedagogy	0.0700	0.0564
		Technology	0.0254*	0.0475
		Community	0.0694	0.0537
		Total	0.1648	0.0685
Failure background attribution	Direct		0.0858	0.0991
	Indirect	Pedagogy	0.0352*	0.0305
		Technology	0.0135*	0.0246
		Community	0.0446*	0.0350
		Total	0.0933	0.0412

Conclusions

In the research, we use the method of online learning environment as the intermediary variable to study the effect of online learners' attribution on learning performance. The conclusions are as follows:

(1) Luck attribution has no correlation with learning performance and has no effect.

(2) Ability, effort and background attribution have significant positive correlation with learning performance, but the direct effect is not significant. It shows that these attributional characteristics cannot directly predict learning performance, it is consistent with some of the earlier studies (Zhou, Dong, 1994; Chen, Hu, 2008).

(3) The results show that the total ability attribution has no significant effect on learning performance; the total effort attribution has a significant effect on learning performance through the mediating effect of pedagogy; the total background attribution has a significant effect on learning performance through the mediating effect of pedagogy, technology and community. These effects can positively predict learning performance.

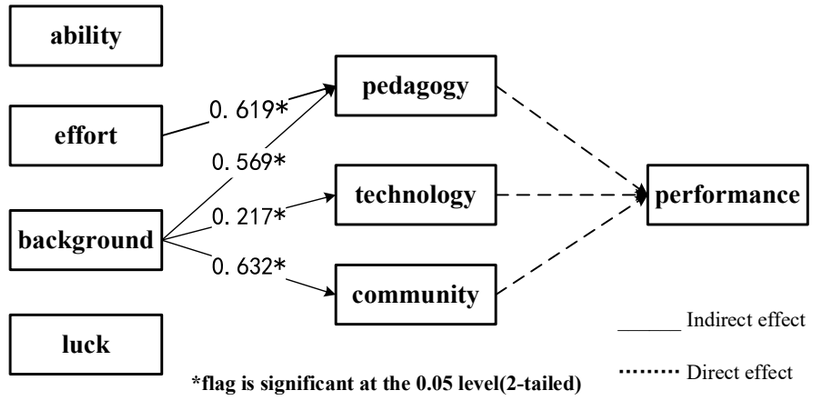

Figure 3 The indirect effect of the total attribution on learning performance

(4) The indirect effect of the success ability (sabilityuy) attribution and failure ability (fability) attribution through the mediating effect of online learning environment is significant, forming a positive prediction. The mediating effect of community is the most significant, followed by pedagogy and technology.

(5) The indirect effect of the successful effort (seffort) attribution and failure effort (feffort) attribution is significant through the mediating effect of online learning environment, forming a positive prediction. The mediating effect of community is the most significant, followed by pedagogy and technology.

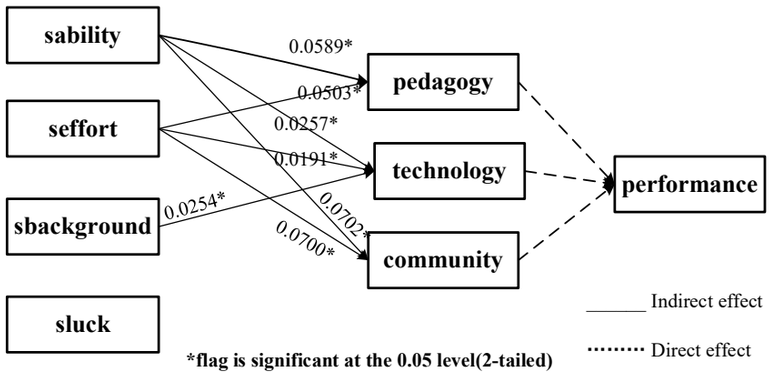

Figure 4 The indirect effect of the success attribution on learning performance

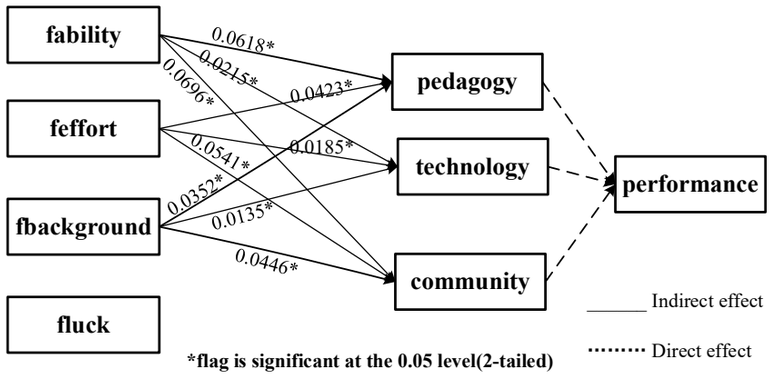

Figure 5 The indirect effect of the Failure attribution on learning performance

(6) The indirect effect of the successful background (sbackground) attribution has a significant effect on learning performance through the mediating effect of technology. Failure background (fbackground) attribution has a significant indirect effect on learning performance through the mediating effect of online learning environment. Both of them forming a positive prediction of learning performance.

The experimental results can enlighten online educators and instructional design professionals: In accordance with some early research conclusions, learning attribution has no direct effect on learning performance (Zhou, Dong, 1994; Chen, Hu, 2008).

As learning attribution is the subjective attribute of learners, the way to improve learning performance by changing learners' attribution often encounters in a dilemma.

Through the mediating effect of online learning environment, the indirect effect on internal and positive orientation effort

attribution and ability attribution is more significant, which can better predict learning performance positively. The results of successful attribution confirm this rule.

As an objective attribute of online learning environment, the level of mediating effects of pedagogy, technology and community are community, pedagogy and technology (from strong to weak). Online teaching federals and instructional design professionals should pay more attention to: do not pursue the improvement of online platform technology level in excess, should focus on the level of system community and pedagogy in the online learning environment, both of them play a more important in supporting learning attribution. In fact, on the basis of the research results, it is a long-term and in-depth issue to improve the community and pedagogy of online learning platform.

The effect of failure attribution on learning performance reflects that the mediating effect of online learning environment on learning performance is relatively comprehensive, and online learning environment has widespread significance for improving learning performance. The significance of the effect is the same as mentioned above, and the community is still the most significant.

Limitations

The variable design of measurement tools is still relatively rough, especially the online learning environment questionnaire (29 questions) can't comprehensive and detailed reflect the pedagogy, technology and community of online learning.

The internal dispersion of sample data is large, and the significance level is only limited at 0.05.

The following research should increase the sample size to reflect the general law of online learning more comprehensively.

Reference

Avigall Oren etc. Learnet- a model for virtual learning communities in the World Wide Web. International JI. Of Educational Telecommunications, 2006(2),(142- 157).

Chen Minggui, Hu Zhenbei. Research on the Relationships among Goal Orientation, Learning Strategy, Attribution and Academic Performance in High School Students [J]. Psychological Exploration,2008(03):58-62.

David Mioduser,Rafi Nachmias,Avigail Oren,Orly Lahav. Web-based learning environments (WBLE): Current implementation and evolving trends[J]. Journal of Network and Computer Applications,1999,22(4).

David Mioduser,Rafi Nachmias,Orly Lahav,Avigail Oren. Web-Based Learning Environments[J]. Routledge,2000,33(1).

Hall, B. W., Hines, C. V., Bacon, T.P., Koulianos, G.M. Attributions that teachers hold to account for student success and failure and their relationship to teaching level and teacher efficacy beliefs[J]. Paper presented at the Annual Meeting of the American Educational Research Association, 1992,4.

J. Zimmerman &Martinez-Pons, Student Differences in Self- Regulated Learning: Relating Grade, Sex, and Giftedness to Self-efficacy and Strategy Use. [J]. Journal of Educational Psychology,1990,82, (51-59).

Liang Yujuan, Peng Huamao, Wang Ying, Huang Ronghuai, Chen Geng. Development of online learning community evaluation questionnaire [J]. China Distance Education, 2007 (01): 25-28.

Liao Fenglin. Investigation and analysis of the self-awareness of the reasons for the success or failure of junior high school students [J]. Modern primary and secondary education, 1993 (06): 55-57.

Lin Zhongmin. The principle of Weiner's attribution theory and the structure of causes [J]. Psychology trends, 1989 (01): 1-8.

Liu Huijun. Research progress on the theory and application of contemporary learning motivation [J]. Journal of Capital Normal University (Social Sciences Edition),2002(05):112-117.

Liu Zhihua, Guo Zhanji. A study of the relations among achievement motivation, learning strategy, and academic achievement in junior middle school students[J]. Psychological Science,1993(04):8-14+66.

Pokay & Blumenfield: Predicting Achievement Early and Late in the Semester: The Role of Motivation and Use of Learning Strategies. [J]. Journal of Educational Psychology, 1990,82, (41-50).

Shi Yaofang. On learning strategies [J]. Psychological development and education, 1991 (03): 55-58 + 53.

Sui Guangyuan. A Follow-up Study on the Effect of Attributional Training for Achievement Motivation [J]. Psychological Science, 2005(01):52-55.

Sui Guangyuan. A study of the training of achievement motivation attribution in middle school students [J]. Psychological Science, 1991(04):23-28+66.

T. Andrew Zabel,Ronna Linroth,Andrea D. Fairman. The Life Course Model Web Site: An Online Transition-Focused Resource for the Spina Bifida Community[J]. The Pediatric Clinics of North America. 2010(4)

Weiner B. An attributional theory of achievement motivation and emotion[J]. Psychological Review. 1985.92:548-573.

Xing Kuan, Yao benxian. Research progress of Motivation Attribution Theory [C]. Chinese Psychological Society. Proceedings of the 12th National Psychological Congress. Chinese Psychological Society: Chinese Psychological Society, 2009:464.

Xu Huifu. Investigation and Analysis on the attribution of academic achievement of distance learning students [J]. China educational technology, 2003 (08): 64-67.

Yang Xinde. A preliminary study on success or failure attribution of junior high school students [J]. Psychological Science Communications,1987(06):49-51.

Zhang Weiyuan. Design and development of evaluation model, index system and evaluation scale of online learning environment [J]. China Educational Technology, 2004 (07): 29-33.

Zhong Keding, Zhao Hailing. Study of Imputation mode of Distance Learners' Achievement Attribution [J]. Open Education Research,2006(03):66-69.

Zhong Keding. Online learning and development [M]. Beijing: Higher Education Press, 2011, p21-27

Zhou Guotao, Zhahg Ping, Li Liping, Liu Xiaohua. A Study of the Relationships Among Perceived Competence, Learning Strategies and Achievement in Junior Middle School Students' Equation Learning [J]. Psychological Science,1997(04):324-328+384.

Zhou Yong, Dong Qi. The relationship between learning motivation, attribution, self-efficacy and students' self-monitoring learning behavior [J]. Psychological development and education, 1994 (03): 30-33 + 15.