An Empirical Study on Learning Engagement, Learning Motivation and Oral English Achievement in Blended Learning Environment

Lin Zhang

lynchang@yeah.net

Xi'an Eurasia University, Xi'an ,710065, China

Abstract: Based on the investigation of higher vocational college students majoring in English in Xi'an Eurasia University, the study analyzed the correlation among learning engagement, learning motivation and oral English achievement in blended learning environment through literature analysis, questionnaire survey and quantitative research. The results revealed that: In blended learning environment, 1) English learning engagement is significantly related to oral English achievement; 2) learning motivation is positively correlated with oral English achievement; 3) there is a closely positive correlation between learning engagement and learning motivation. This study suggests that teachers should stimulate students' intrinsic interests in blended learning to the maximum extent, and enhance their emotional and cognitive engagement so as to help them achieve better learning outcome.

Keywords: blended learning; learning engagement; learning motivation; oral English achievement

1 Introduction

In 2021, the Ministry of Education of China proposed to explore a new mode of online and offline mixed teaching to support the high-quality development of education[1]. Colleges and universities have been promoting the reform of curriculum teaching in full swing. Blended learning with online courses in MOOC and SPOC has become the new normal of education, but learners' learning outcome is patchy. In recent years, learning engagement, as an important factor affecting the quality of blended learning, has attracted considerable attention from scholars. Shi Fanghua believed that students' learning engagement should be included in education evaluation to measure the quality of education and teaching[2]. Hu Xiaoyong held that there is a direct positive relationship between students' online learning engagement and learning performance[3]. Currently, most of the research on blended learning engagement are theoretical, focusing on undergraduate students, and there are few empirical studies on correlations between blended learning engagement, students' learning motivation and learning outcome. Therefore, this study, based on the blended learning of *English Speaking* of higher vocational college students majoring in English in Xi'an Eurasia University, explored the relationship among learners' English learning engagement, learning motivation and oral English achievement through literature analysis, questionnaire survey and quantitative research, and put forward

NMDME 2023, October 13-15, Xi'an, People's Republic of China

DOI 10.4108/eai.13-10-2023.2341079

suggestions for teaching based on research results, with a view to providing reference for improving the quality of blended learning and learners' learning outcome.

2 Theoretical background

Blended Learning originated from E-learning at the end of 20th century. Broadly speaking, Margret Driscoll[4], Harvi Singh and Chirs Reed[5], Prof. Li Jiahou[6] and Prof. Ronghuai Wang[7] held that blended learning refers to a learning method that mixes various teaching elements to meet teaching needs, such as teaching methods, teaching modes and strategies, information technology, and adopts appropriate learning technologies to cultivate learners' abilities in an appropriate time, so as to achieve optimal learning results. In a narrow sense, Prof. He Kekang[8], Li Kedong, Zhao Jianhua, et al.[9] defined blended learning as an organic integration of the advantages of online learning and face-to-face learning, giving full play to teachers' leading role in teaching and students' dominant position in learning, so as to achieve teaching objectives and optimal teaching effect. To sum up, blended learning has been defined differently, but it is essentially the same. This study adopted the broad definition, which emphasizes the use of online and offline teaching elements and optimal teaching methods to achieve the best learning effect and teaching objectives.

The concept of Learning Engagement was first put forward by educational psychologist Tyler in 1930. Newman clearly concluded that students' learning engagement involves both behavioral and psychological aspects through large-scale empirical research[10]. Subsequently, many researchers began to define the concept of Learning Engagement from a multi-dimensional perspective. Kong Qiping[11], Fredricks, et al.[12] believed that Learning Engagement (LE) covers behavioral, emotional and cognitive dimensions. Behavioral Engagement (BE) refers to students' deep participation in learning, including independent learning, cooperative learning. Emotional Engagement (EE) refers to students' positive emotions in learning, such as interest and happiness. Cognitive Engagement (CE) refers to the degree of students' intellectual efforts in learning, including the use of cognitive strategies and resource management learning strategies. This study adopted Fredricks' definition of learning engagement.

In 1985, psychologist Gardner defined foreign language learning motivation as "the time and energy spent by the learning object to achieve a specific goal in conducting an activity, and the learning attitude reflected in the activity."[13] Subsequently, educators have carried out multi-angle research on learning motivation. American psychologists Deci Edward L., Ryan Richard M., et al. put forward Self-Determination Theory of motivation in 1980s, which classified learning motivation into intrinsic motivation, extrinsic motivation and no motivation[14]. The empirical research on foreign language learning motivation in China mostly followed the classic and extended model. Considering the teaching objects are Chinese students, Gao Yihong, et al.[15] put forward seven types of foreign language learning motivation of Chinese college students: intrinsic interest motivation (IIM, interest in the target language and culture), motivation for achievement (MFA, for passing the test, obtaining admission qualification and academic certificate), motivation for going abroad (MFGA, for overseas education and employment, cultural experience or immigration), learning situational motivation (LSM, impact from course, teacher, teaching materials, class), motivation for social responsibility

(MFSR, for serving the motherland and parents), motivation for personal development (MFPD, for securing ideal career, social position and accomplishment), and motivation for information media (MFIM, for getting more information and learning other majors via English). The theoretical model and questionnaire of foreign language learning motivation put forward by Gao, et al., in line with the characteristics of Chinese college students, have exerted widespread impact in China. This study adopted the definition and classification of learning motivation by Gardner, Gao, et al.

3 Research design and implementation

3.1 Research questions

In this study, higher vocational college students majoring in English were investigated to figure out the correlation among their learning motivation, learning engagement and oral English achievement, and the following questions were mainly explored: 1) What are the students' English learning engagement, learning motivation and oral English achievement? 2) How do the students' English learning engagement and motivation affect their oral English achievement? 3) Is there a correlation between learning engagement and learning motivation?

3.2 Research object

51 freshmen, 18-20 years old, majoring in English in higher vocational colleges in Xi'an Eurasia University were chosen as the research object. They attended the course *English Speaking* delivered by the same teacher in the same autumn semester in two classes. As a mixed online and offline course aiming at cultivating students' English language ability, the course has already been in operation for three semesters, covering more than 2,000 higher vocational college students. The course integrates process evaluation and summative evaluation to evaluate students' learning in the whole process, and is conducted in three links of teaching process: before class (students' self-directed learning), during class (teachers' guidance and students' exploratory learning) and after class (outcome-oriented practice by students). Before class, students are required to complete online self-directed learning on MOOC and Tronclass. In class, traditional classroom learning is combined with Tronclass to complete various forms of teacher-student interaction, such as random roll call, classroom Q&A, online test, voting. Effective interaction is realized through instant evaluation feedback, which fully mobilizes students' learning enthusiasm and initiative. After class, students should finish group practice tasks and upload it to Tronclass, and teachers can judge whether students have achieved learning outcome and teaching objectives.

3.3 Research tools

3.3.1 Questionnaire on English learning engagement in blended learning

This study independently designed the blended learning engagement scale (BLES) by referring to the questionnaire on English learning engagement compiled by Prof. Li Shuang[16] and analyzing the measurement dimension and index setting of learning engagement. Based on trial testing, modification and expert consultation, the BLES was established with 18 questions in 3 dimensions, i.e., BE (Questions 1-7), EE (Questions 8-13) and CE (Questions 14-18); adopted

5-point Likert scale (strongly disagree=1, disagree=2, neither agree or disagree=3, agree=4, strongly agree =5). Its reliability and validity are shown in Table 1-2 below.

Table 1 reliability of BLES and three dimensions of English learning engagement

	Cronbach's α	items
LE	.807	18
BE	.701	7
EE	.763	6
CE	.786	5

Cronbach's α is the most commonly used model to measure internal consistency, and the internal consistency of the test was measured according to a certain formula[17]. According to Table 1, Cronbach's α for subjects' English learning engagement (0.807) and that for BE (0.701), EE (0.763) and CE (0.786) are indicative of the internal consistency and reliability of BLES.

Table 2 KMO and Bartlettt's test of BLES

Kaiser-Meyer-Olkin measure of sampling adequacy		.735
Bartlettt's test of sphericity	Approx. Chi-square	50.955
	Df	3
	Sig.	0.000

The KMO value of the BLES is 0.735 (see Table 2). Kaiser[18] recommended accepting values greater than 0.5 as acceptable. A value more than 0.7 is the common threshold for confirmatory analysis[19]. The overall internal validity of BLES is greater than 0.7, reaching the threshold of questionnaire validity. In addition, the results of Bartlett's test sphericity showed that the significant value of BLES is 0.000 ($p<0.01$). All proved that BLES has high internal validity.

3.3.2 Questionnaire on English learning motivation in blended learning

The questionnaire on blended English learning motivation in this study referred to *the Questionnaire of Chinese Undergraduate English Learning Motivation* designed by Gao Yihong, et al., and has been adapted to some extent. Based on trial testing, modification and expert consultation, the adapted blended learning motivation scale (BLMS) was established with 28 questions in 7 dimensions, i.e., LSM (Questions 1-5), MFA (Questions 6-10), MFGA (Questions 11-13), MFPD (Questions 14-18), MFIM (Questions 19-21), MFSR (Questions 22-24), IIM (Questions 25-28); adopted 5-point Likert scale (strongly disagree=1, disagree=2, neither agree or disagree=3, agree=4, strongly agree =5). Its reliability and validity are shown in Table 3-4 below. Cronbach's α for subjects' English learning motivation (0.832) and that for LSM (0.876), MFA (0.811), MFGA (0.879), MFPD (0.808), MFIM (0.833), MFSR (0.822), IIM (0.835) are indicative of the internal consistency and reliability of BLMS.

Table 3 reliability of BLMS and seven dimensions of English learning motivation

	Cronbach's α	items
LM	.832	28
LSM	.876	5
MFA	.811	5
MFGA	.879	3
MFPD	.808	5
MFIM	.833	3
MFSR	.822	3
IIM	.835	4

The KMO value of the BLMS is 0.722 >0.5 (see Table 4); the results of Bartlett's test sphericity showed that the significant value of BLMS is 0.000 ($p<0.01$). All proved that BLMS has high internal validity.

Table 4 KMO and Bartlettt's test of BLMS

Kaiser-Meyer-Olkin measure of sampling adequacy		.722
Bartlettt's test of sphericity	Approx. Chi-square	187.942
	Df	21
	Sig.	0.000

3.3.3 Oral English test in blended learning

In the fall semester of 2022, two classes of subjects were tested on their oral English ability. The scope of the test ranges from vocabulary, viewpoint expression to language fluency. The test and the final score were given by the same teacher with a unified standard (the maximum score of 100).

3.3.4 Data analysis

All analyses were carried out using SPSS, version 26 and EXCEL2004. The related data were calculated by descriptive statistics, and the related variables were statistically analyzed by correlation analysis and regression analysis.

4 Research results and discussion

4.1 Overall situation of learners' oral English achievement

Regarding the mean of a 5-point Likert scale, the level of interpretation for the mean value is 1.0-1.80 (very low), 1.81-2.60 (low), 2.61-3.40 (moderate), 3.41-4.20 (high), and 4.21-5.00 (very high)[20]. Statistical analysis of oral English test was performed using SPSS software (1=below 60, 2=60-70, 3=71-80, 4=81-90, 5=91-100), and the results showed that the average score of students' oral English test is 3.41, indicating that the students' oral English achievement (OEA) is at a high level (M=3.41, SD=1.134).

4.2 Correlation between learners' English learning engagement and their oral English achievement

A total of 51 questionnaires were issued in this study, with a valid questionnaire recovery rate of 100%. This study made a descriptive statistical analysis of the subjects' English learning engagement and the mean of its three dimensions. Table 5 showed the subjects' English learning engagement (M=3.756) at a high level. In descending order, the average values of the three dimensions of learning engagement are as follows: EE (M=3.8137), BE (M=3.7955), and CE (M=3.6314), all of which are at a high level. Thus, the subjects' English learning engagement is at a high level. Pearson Correlation was performed based on data obtained from the BLES to prove the correlation among the English learning engagement, its three dimensions and OEA. The results (Table 5) revealed strong correlations between LE and OEA (r=0.558, p<0.001), between EE and OEA (r=0.537, p<0.001), between CE and OEA (r=0.535, p<0.001); moderate correlation between BE and OEA (r=0.351, p<0.05), indicating that LE, BE, EE and

CE are positively correlated with OEA. In other words, the more intensive LE, the better OEA; the less intensive LE, the worse OEA.

Table 5 descriptive statistics and correlation analysis of English learning engagement and three dimensions and oral English achievement

	LE	BE	EE	CE	OEA
LE	1				
BE	.832***	1			
EE	.854***	.511***	1		
CE	.873***	.634***	.632***	1	
OEA	.558***	.351*	.537***	.535***	1
Mean	3.756	3.7955	3.8137	3.6314	3.41
SD	0.44125	0.43823	0.5712	0.5648	1.134

***p<0.001，**p<0.01， *p<0.05

Taking OEA as the dependent variable, BE, EE and CE as the independent variables, this paper analyzed the mechanism of LE on OEA by regression analysis. The results (Table 6) showed that the correlation coefficient R of the regression equation between BE, EE and CE and OEA is 0.594, Adj. R^2=0.353, indicating that LE can explain the 35.3% variation of OEA; F=8.561, P=0.000<0.01, saying that there is an extremely significant linear relationship between LE and OEA. Statistically, EE (b=0.112, β=0.34, p=0.032<0.05) and CE (b=0.14, β=0.347, p=0.048<0.05) can significantly positively predicts OEA, while BE cannot predict OEA (b=-0.016，β=-0.043，p=0.784>0.05). So LE has a significantly positive predictive effect on OEA mainly through EE and CE.

Table 6 regression analysis of English learning engagement on oral English achievement

	Unstandardized coefficients B	Std. Error	Standardized coefficients Beta	t	Sig.	VIF
(Constant)	-1.275	1.211		-1.053	0.298	
BE	-0.016	0.057	-0.043	-0.276	0.784	1.729
EE	0.112	0.051	0.34	2.205	0.032	1.724
CE	0.14	0.069	0.347	2.029	0.048	2.129
R			0.594a			
Adj. R^2			0.353			
F			8.561		0.000	
D-W			1.874			

a Dependent variable: OEA

4.3 Correlation between learners' English learning motivation and their oral English achievement

In order to better understand the subjects' English learning motivation, this study made a descriptive statistical analysis of the average of English learning motivation and its seven dimensions. Table 7 showed the average LM (M=3.5784) at a high level. In descending order, the average values of the seven dimensions of learning motivation are as follows: MFPD(M=3.8941), MFSR (M=3.8497), MFIM (M=3.6405), IIM (M=3.6225), LSM (M=3.5647), MFA (M=3.5608), MFGA (M=2.7124), all of which are at a high level. According to the mean of 5-point Likert scale, LM, MFPD, MFSR, MFIM, IIM, LSM and MFA are at a

high level, and MFGA is at a moderate level. SPSS software, version 26 was used to verify the correlation between LM and OEA, and analyze the Pearson correlation on LM and its seven dimensions and OEA. Pearson Correlation was performed based on data obtained from the BLMS to verify the correlation among the English learning motivation, its seven dimensions and OEA. Table 7 demonstrated strong correlations between LM and OEA (r=0.621, p<0.001), between IIM and OEA (r=0.570, p<0.001); moderate correlations between LSM and OEA (r=0.394, p<0.01), between MFA and OEA (r=0.384, p<0.01), between MFGA and OEA (r=0.421, p<0.01), between MFPD and OEA (r=0.460, p<0.01), between MFIM and OEA (r=0.481, p<0.001), between MFSR and OEA (r=0.474, p<0.001), indicating that English LM and its seven dimensions are positively correlated with OEA.

Table 7 descriptive statistics and correlation analysis of English learning motivation and seven dimensions and oral English achievement

	LM	LSM	MFA	MFGA	MFPD	MFIM	MFSR	IIM	OEA
LM	1								
LSM	.691***	1							
MFA	.780***	.789***	1						
MFGA	.585***	0.166	0.204	1					
MFPD	.727***	.375**	.468**	.355*	1				
MFIM	.721***	0.23	.382**	.456**	.431**	1			
MFSR	.796***	.286*	.517***	.515***	.544***	.683***	1		
IIM	.768***	.283*	.348*	.447**	.537***	.751***	.738***	1	
OEA	.621***	.394**	.384**	.421**	.460**	.481***	.474***	.570***	1
Mean	3.5784	3.5647	3.5608	2.7124	3.8941	3.6405	3.8497	3.6225	3.41
SD	0.56111	0.82917	0.75474	1.00669	0.6291	0.77701	0.71278	0.80214	1.134

***p<0.001，**p<0.01，*p<0.05

Taking OEA as the dependent variable, LSM, MFA, MFGA, MFPD, MFIM, MFSR and IIM as the independent variables, the study analyzed the mechanism of LM on OEA by regression analysis. The results (Table 8) showed that the correlation coefficient R of the regression equation between LSM, MFA, MFGA, MFPD, MFIM, MFSR, IIM and OEA is 0.653, Adj. R^2=0.426, indicating that LM can explain 42.6% variation of OEA. The value of D-W is 1.824, between 0 and 4, saying that the data is independent. F=8.561, p=0.000<0.01, indicating that there is an extremely significant linear relationship between LM and OEA. Statistically, LSM (b=0.314，β=0.229，p=0.266>0.05), MFA (b=-0.025，β=0.179，p=0.942>0.05), MFGA (b=0.201，β=0.179，p=0.207>0.05), MFPD (b=0.234，β=0.13，p=0.389>0.05), MFIM (b=0.109，β=0.074，p=0.693>0.05), MFSR(b=-0.076，β=-0.048，p=0.824>0.05) cannot predict OEA, while IIM (b=0.482，β=0.371，p=0.018<0.05) can significantly positively predicts OEA. So LM has a significantly positive predictive effect on OEA mainly through IIM.

Table 8 regression analysis of English learning motivation on oral English achievement

	Unstandardized coefficients		Standardized coefficients	t	Sig.	VIF
	B	Std. Error	Beta			
(Constant)	-0.92	0.937		-0.982	0.332	
LSM	0.314	0.278	0.229	1.127	0.266	3.098
MFA	-0.025	0.348	-0.017	-0.073	0.942	4.004
MFGA	0.201	0.157	0.179	1.28	0.207	1.458
MFPD	0.234	0.269	0.13	0.87	0.389	1.666

MFIM	0.109	0.274	0.074	0.397	0.693	2.637
MFSR	-0.076	0.341	-0.048	-0.224	0.824	3.436
IIM	0.482	0.302	0.371	1.597	0.018	3.406
R			0.653[a]			
Adj. R^2			0.426			
F			4.559		0.001[b]	
D-W			1.824			

a Predicted variables: (constant), IIM, LSM, MFGA, MFPD, MFIM, MFSR, MFA b Dependent variable: OEA

4.4 Correlation between English learning motivation and learning engagement

Pearson correlation analysis showed (Table 9) that the correlation coefficient between LE and LM is 0.492, and the *p* value is 0.000<0.001, meaning that there is a very significant positive correlation between LE and LM, that is, the stronger LM, the more intensive LE; the weaker LM, the less intensive LE.

Table 9 descriptive statistics and correlation analysis of English learning engagement and English learning motivation

	LE	LM
LE	1	.492***
LM	.492***	1
Mean	3.756	3.5784
SD	0.44125	0.56111

***p<0.001

Taking LE as the dependent variable, LM as the independent variables, the study analyzed the mechanism of LM on LE by regression analysis. The results (Table 10) showed that the correlation coefficient R of the regression equation between LM and LE is 0.492, Adj. R^2=0.242, indicating that LM can explain 24.2% variation of LE. The value of D-W is 2.277, between 0 and 4, saying that the data is independent. F=15.652, p=0.000<0.01, indicating that there is an extremely significant linear relationship between LE and LM. Statistically, LM(b=0.387，β=0.492，P<0.001) can significantly positively predicts LE. In other words, the stronger the learner's LM, the more intensive LE.

Table 10 regression analysis of English learning motivation on English learning engagement

	Unstandardized coefficients		Standardized coefficients	t	Sig.	VIF
	B	Std. Error	Beta			
(Constant)	2.371	0.354		6.696	0.000	
LM	0.387	0.098	0.492	3.956	0.000	1.000
R			0.492[a]			
Adj. R^2			0.242			
F			15.652		0.000	
D-W			2.777			

a Predicted variables: (constant), LM b Dependent variable: LE

5 Conclusions

To sum up, learners' learning engagement in blended learning environment was at a high level (3.756), and its three dimensions in descending order were as follows: emotional engagement (3.8137), behavioral engagement (3.7955) and cognitive engagement (3.6314). Learners' learning motivation in blended learning environment was at a high level (3.5784), and its seven

dimensions in descending order were as follows: motivation for personal development (3.8941), motivation for social responsibility (3.8497), motivation for information media (3.6405), intrinsic interest motivation (3.6225), learning situational motivation (3.5647), motivation for achievement (3.5608) and motivation for going abroad (2.7124). According to the analysis of data obtained from the BLES and BLMS, there was a correlation among learners' learning engagement, learning motivation and oral English achievement in blended learning environment. English learning engagement was positively correlated with oral English achievement, which was significantly positively predicted by emotional engagement ($\beta=0.34$, $p=0.032<0.05$) and cognitive engagement ($\beta=0.347$, $p=0.048<0.05$). English learning motivation was positively correlated with oral English achievement, which was significantly positively predicted by intrinsic interest motivation ($\beta=0.371$, $p=0.018<0.05$). There was a positive correlation between learning engagement and learning motivation, and the latter had a significantly positive predictive effect on the former ($\beta=0.492$, $P<0.001$). Generally speaking, the stronger the English learning motivation, the better the oral English achievement; the stronger the learning motivation, the more intensive learning engagement; the more intensive English learning engagement, the better the oral English achievement.

Based on the above research, the following suggestions for teaching are put forward: In order to achieve the learning results of English courses, it is necessary to cultivate and promote the intrinsic interests of higher vocational college students and strengthen their emotional and cognitive engagement. Higher degree of students' intrinsic interest brings higher level of learning motivation and enthusiasm. Thus, they're more likely to study hard and obtain desired learning outcome. In the process of blended learning of English courses, teachers should foster the intrinsic interests of higher vocational college students in courses learning, optimize learning context, and flexibly adopt teaching strategies and methods to stimulate their enthusiasm and initiative in blended learning, so as to enhance their engagement in blended learning and ultimately help them achieve good learning outcomes and academic achievements.

Acknowledgements: This research was supported by the 2023 Annual Project of the 14th Five-Year Plan for Educational Science in Shaanxi Province (Grant No. SGH23Y2822).

References

[1] Ministry of Education of China. (2021) Explore and promote the new mode of online and offline education and teaching to support the high-quality development of education. https://www.edu.cn/info/focus/zc/202112/t20211202_2182192.shtml.

[2] Shi Fanghua. (2010) A new perspective of undergraduate education quality evaluation reform: learning engagement. Modern Education Management, 05:51-54. 10.3969/j.issn.1674-5485.2010.05.015.

[3] Hu Xiaoyong, Xu Huanyun, Chen Zexuan. (2020) An Empirical Study on the Relationship among Learners' Information Literacy, Online Learning Engagement and Learning Performance. China Educational Technology, 41(03):77-84.

[4] Margaret Driscoll.(2002) Blended Learning: Let's Get Beyond the Hype. http://www-07.ibm.com/services/pdf/blended_learning.pdf.

[5] SINGH, H. & REED, C. (2001) A White Paper: Achieving Success with Blended Learning. 10.1001/jama.284.24.3187.

[6] Li Jiahou. (2004) On the definition and translation of “blended learning”. http://www.jeast.net/jiahou/archives/ 000618.html
[7] Huang Ronghuai, Ma Ding, Zheng Lanqin, et al. (2009) Curriculum Design Theory Based on Blended Learning. E-Education Research, l:9-14. CNKI:SUN:DHJY.0.2009-01-004.
[8] He Kekang. (2004) New Development of Educational Technology Theory from Blending Learning (I). E-Education Research, 3:1-6.
[9] Li Kedong, Zhao Jianhua. (2004) Principle and Application Mode of Blended Learning. E-Education Research, 07:1-6. CNKI:SUN:DHJY.0.2004-07-000.
[10] NEWMAN F M. (1992) Student Engagement and Achievement in American Secondary Schools. New York: Teachers College Press. 10.5860/choice.30-3945.
[11] Kong Qiping. (2000) Concept and structure of “student engagement”. Global Education, 29(02):72-76. CNKI:SUN:WGJN.0.2000-02-016.
[12] FREDRICKS, BLUMENFELD, ALISON H PARIS. (2004) School Engagement: Potential of the Concept, State of the Evidence. Review of Educational Research, 74(1):59-109. 10.3102/00346543074001059.
[13] GARDNER R C. (1985) Social Psychology and Second Language Learning: The Role of Attitudes and Motivation. Edward Arnold, London. p28. http://dx.doi.org/.
[14] DECI L, RYAN M. (1985) Intrinsic Motivation and Self-Determination in Human Behavior. Plenum, New York. pp.85-90. 10.2307/2070638.
[15] Gao Yihong, Zhao Yuan, Cheng Ying, et al. (2003) English learning motivation types of undergraduates in Chinese Universities. Modern Foreign Languages, 01:28-38+6-8. 10.3969/j.issn.1003-6105.2003.01.005.
[16] Li Shuang, Wang Zengxian, Yu Chen, et al. (2016) Research on online learning behavior engagement analysis framework and measurement indicators-learning analysis based on LMS data. Open Education Research, 22(02):77-88. 10.13966/j.cnki.kfjyyj.2016.02.010.
[17] Zhang Qi. (2009) Application of SPSS for Windows in Psychology and Pedagogy. Peking University Publishing House, Beijing. P8. 978-7-301-14400-8.
[18] Kaiser, H. F., & Rice, J. (1974) Little Jiffy, Mark IV. Educational and Psychological Measurement, 34 (1):111-117. 10.1177/001316447403400115.
[19] J. F. Hair Jr., W. C. Black, B. J. Babin, R. E. Anderson. (2010) Multivariate Data Analysis, Pearson Prentice Hall. https://www.epj-conferences.org/10.1051/epjconf/20100402004.
[20] Issam Khalil Abu-Baker M, Khair Saleem Abu-Zaid M, Alsawalqah H, et al. (2019) The Impact of the Implementation of Capability Maturity Model Integration on User Satisfaction: Case Study on Software Companies in Jordan. Journal of Software, 14(7):293–311. 10.17706/jsw.14.7.293-311.