Efficacy of Usage of Learning App on New Media Literacy of Prospective Rural Chinese Language Teachers in the Post Era of COVID-19

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Abstract

In the post era of COVID-19, learning App, the abbreviation of a learning application, has gradually become an important educational new media technology for successful surviving digital world and smart education. However, few attempts have been made to explore the efficacy of learning App on new media literacy (NML) which defined as a set of cultural and social skills to survive in a new media technology environment. The objective of the study is to investigate the efficacy of the usage of learning App on NML. The population of this research was made up 160 prospective rural Chinese language teachers who were chosen by convenient sampling. The study was based on the framework composed of the twelve new media literacy. Structured questionnaire was used as the tool for data collection. ANOVA, MANOVA, Post Hoc Test were used for the data analysis. The findings of this study showed that the duration of learning App use has significant moderate efficacy on the overall new media literacy and its eight sub dimensions called play, simulation, appropriation, judgment, trans-media navigation, networking, negotiation, visualization among the prospective rural Chinese language teachers. Accordingly, this study has shed light on the use learning App for more economical learning and teaching among prospective rural Chinese language teachers education.

Keywords: *COVID-19; usage of learning App; efficacy; new media literacy; relational survey model; prospective rural Chinese language teachers*

1. INTRODUCTION

Learning App, the abbreviation of a learning application, has gradually become an important tool to consider in e-learning research and digital transformation of education in the post era of COVID-19 [1]. But few attempts have been made to investigate the efficacy of learning App on new media literacy which has been recognized as an important competency for student and teacher to survive in the new media landscape in China [2][3][4][5]. To enrich the relevant literature and expand knowledge, the objective of the study tries to investigate the efficacy of the usage of learning App on new media literacy (NML) of the prospective rural Chinese language teachers (PRCLT). This was a cross-sectional survey involving 160 PRCLT participants in the Departments of Literature and Journalism of Leshan Normal University in Southwest China. Jenkins' 12 new media literacy skills provide a framework the study based on. Structured questionnaire will be used as instrument of data collection. For the data analysis, descriptive statistics, a series ANOVA, MANOVA, Post hoc Test will be used to discover the efficacy of duration of learning App use on overall NML and its 12 sub dimensions. Structured questionnaire will be used as instrument of data collection. In the other words, the current study will seek the answers to the following questions:

Q1 Does the score of overall new media literacy of prospective rural Chinese language teachers change with respect to duration of learning App use? If does, to what extent?

Q2 Do the scores of twelve sub dimensions of new media literacy of prospective rural Chinese language teachers change with respect to duration of learning App use? If do, to what extent?

2. THEORETICAL FRAMEWORK

In the current research, new media refers to various social and cultural platforms or app based on information technology. New media literacy is defined as a series of cultural and social skills needed to survive in the new media landscape. The new media literacy (NML) was named by Jenkins' 12 new media literacy skills as below [3].

·Play: The capabilities to experiment in the surrounding environment as a solution to a problem.

·Performance: The capabilities to make use of alternative identities for improvisation and discovery purposes.

·Simulation: The capabilities to interpret and build dynamic models of authentic world processes.

·Appropriation: The capabilities to meaningfully sample and remix media content.

·Multitasking: The capabilities to observe one's own environment and shift focus to critical details as needed.

·Distributed cognition: The capabilities to interact meaningfully with tools that amplify mental competence.

·Collective intelligence: The capabilities to bring knowledge together and compare it with others on common goals.

·Judgment: The capabilities to assess the reliability and credibility of different information sources.

·Trans-media navigation: The competency to follow a trail the flow of stories and information across multiple modalities.

·Networking: The capabilities to search for, synthesize, and spread information.

·Negotiation: The capabilities to recognize and respect different perspectives, master and follow different norms through different communities.

·Visualization: The capabilities to interpret and create data representations for expressing ideas, spotting patterns, and identifying trends.

3. METHODOLOGY

3.1. Research Design

This study employed one of the general survey models as part of the quantitative research method. The relational survey model intends to determine the presence and/or degree of co-variation between two and more variables. In the current study, the relationship between time duration and the overall and 12 sub dimensions of new media literacy of prospective rural Chinese language teachers was examined Among them, time duration was regarded as category, independent variable and between-subjects factors which were divided into four levels named group A, group B, group C and group D respectively. New media literacy and its 12 sub dimensions were taken as continuous and dependent variables.

3.2. Participants

The population of this research is made up prospective rural Chinese language teachers in southwest China in the 1st term of the 2021−2022 academic year in post COVID-19. The sample was chosen by convenient sampling among the population comprises 600 rural Chinese language students studying in the departments of literature and journalism of Leshan Normal University. There were 144 (90%) female and 16 (10%) male students in the study aged between 19 and 24 years old. There in after, the researcher inclined to use "PRCLT" to refer prospective rural Chinese language teacher for a shorter and clearer expression.

3.3. Data Collection Tools

In order to collect personal information of the prospective rural Chinese language teachers, a demographic information form was designed which contains questions about gender, age of the participants. The other tool used in the present study was new media literacy scale developed by Literat [6] according to the Jenkins' new media literacy framework. According to English Chinese two-way conversion and expert surface validity test, There are total of 57 questions were reserved and tested with cut into twelve sub scales-play, simulation, performance, appropriation, multitasking, distributed cognition, collective intelligence, judgment, trans-media navigation, networking, negotiation and visualization. The Likert 5-point scoring method is used to score from 1 to 5 points presenting "strongly disagree" to "strongly agree" respectively. In this study, Cronbach's Alpha coefficient of the scale was calculated as 0.938 for the overall scale. Furthermore, The Cronbach alpha coefficient of 12 sub scales range from 0.885 to 0.898.

3.4. Data Processing Analysis

SPSS24.0 software was used to analyze the valid data. Firstly, the normality, homogeneity, linearity of the distribution for the overall new media literacy and its 12 sub dimensions scores were examined in the data

analysis process. Secondly, ANOVA or uni-variate analysis of variance, multivariate analysis of variance (MANOVA), and Post Hoc Tests were used to determine the group that caused the difference. The .05 significance level was accepted for all tests performed. Thirdly, the effect sizes for ANOVA, MANOVA were figured out since the effect size statistics provide information on the magnitude of the differences between groups. Fourthly, to compare the groups, partial eta squared ($\eta 2$) effect size statistics were used. The obtained eta squared values were interpreted as .01 = small effect, .06 = moderate level effect, .14 = big effect [7]. To sum up, in the present study, the relationship between time duration of learning App use and the overall new media literacy of the prospective teachers was examined by using uni-variate variance analysis. ANOVA and MANOVA were used to determine the extent to effect of learning App use time duration on the 12 sub dimensions of the prospective rural Chinese language teachers' new media literacy. Post Hoc Tests was used to identify which time duration groups had significant differences and what kind of difference in post COVID-19.

4. RESEARCH RESULTS

4.1. Results Related to the First Problem

For the first question (Q1): Does the score of overall new media literacy of prospective rural Chinese

language teachers change with respect to duration of learning App use? If does, to what extent? Table 1, Table 2 and Table 3 showed the research results as bellow:

Table 1: Between-subjects factors.

Time duration		Value Label	N	Percent
How much time do you spend on the learning App such as XUEXI App every week in past year?	A	less than 1 hour	86	53.75
	B	1-3 hours	50	31.25
	C	3-5 hours	16	0.10
	D	more than 5 hours	8	0.05

According to the answers given about the question "How much time do you spend on the learning Apps such as QINGNIANDAXUE App, XUEXI App, XUEXITONG App?" Table 1 showed that 53.75% spend less than 1 hour, 31.25% spend 1-3 hours, 10% spend 3-5 hours and 5% spend more than 5 hours on the learning App. In uni-variate analysis of variance, time duration that spent on learning App was regarded as the between-subjects factors. For the factors, Group A (n=86) referred to the use of learning App for less than 1 hour every week, Group B (n=50) referred to the use of learning App for less than 1-3 hours per week, Group C (n=16) referred to the use of learning App for less than 3-5 hours every week, Group D (n=8) referred to the use of learning App for less than 3-5 hours every week.

Table 2: Homogeneity and normality test of overall new media literacy of prospective Chinese language teachers.

	N	Minimum	Maximum	Sum	Mean	Std. Deviation	Skewness	Std. Error	Kurtosis	Std. Error
NML	160	2.98	5.00	596.05	3.725	.393	.285	.192	−.025	.381
			Levene's error variance equality test			F = 1.653	P =. 179 n. s			

The skewness and kurtosis index were conduct to identify the normality of data. All related to statistics were presented in Table 2 with the skewness statistic was .285 and kurtosis statistic was −.025. And Minimum statistic (2.98), maximum statistic (5), mean statistic (3.725) were no floor and ceiling effects in the overall new media literacy. In addition, it was found that

F = 1.653, significance P =. 179, greater than 0.05, not reaching the significant level after Levene's error variance equality test. So it can be accepted the null hypothesis of variance homogeneity in ANOVA. In the other words that the dependent variable were checked to establish a normal distribution and parametric tests were used in the statistical analyze.

Table 3: Uni-variate analysis of variance results related to new media literacy of prospective rural Chinese language teachers in terms of time duration of learning App use.

	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observed Power
Between Groups	3.405	3	1.135	8.366	.000***	.139	.992
Within Groups	21.164	156	.136				
Total	24.569	159					

*p < .05   **P < .01   ***P < .001

According to Table 3, a significant difference was diagnosed between the overall new media literacy (NML) of prospective rural Chinese language teachers according to time duration of learning App use [F (3,156) =8.366, p=.000<.05]. To compare the groups, partial eta

squared ($\eta 2$) effect size statistics were calculated. The obtained eta squared values were interpreted as .01 = small effect, .06 = moderate effect, .14 = big effect [7]. It was observed that the effect size $\eta 2$ was .139. Therefore, it can be said that time duration of learning

App use has a significant moderate efficacy on the overall media literacy of prospective rural Chinese language teachers. Observed Power was .992, it was imply that the accuracy of inferential decision-making is 99.2% in the study.

4.2. Results Related to the Second Problem

For the second question (Q2): Do the scores of twelve sub dimensions of new media literacy of prospective rural Chinese language teachers change with respect to duration of learning App use? If do, to what extent? Table 4, Table 5 and Table 6 showed the research results as bellow:

Table 4: Descriptive statistics on the twelve dimensions of new media literacy

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
play	160	2.600	5.000	3.868	0.562	0.203	0.192	−0.131	0.381
simulation	160	2.200	5.000	3.754	0.556	0.130	0.192	0.027	0.381
performance	160	1.750	5.000	3.484	0.621	0.027	0.192	0.060	0.381
appropriation	160	2.200	5.000	3.540	0.588	0.116	0.192	−0.006	0.381
distributed cognition	160	2.400	5.000	3.721	0.513	0.229	0.192	0.063	0.381
multitasking	160	2.400	5.000	3.588	0.570	0.168	0.192	−0.072	0.381
collective intelligence	160	2.600	5.000	3.840	0.508	0.052	0.192	−0.148	0.381
judgment	160	3.000	5.000	3.856	0.532	0.113	0.192	−0.312	0.381
trans-media navigation	160	1.400	5.000	3.891	0.634	-0.407	0.192	1.056	0.381
networking	160	2.000	5.000	3.574	0.600	0.270	0.192	−0.063	0.381
negotiation	160	2.400	5.000	3.805	0.593	-0.060	0.192	−0.273	0.381
visualization	160	2.670	5.000	3.783	0.567	0.245	0.192	−0.183	0.381
Box's Test of Equality of Covariance Matrices					Box's M=54.815，Sig P=.427 n. s. p				

*p < .05   n. s. p > .05

Table 4 showed statistics of minimum, maximum, mean were no floor and ceiling effects in twelve dimensions of new media literacy (NML) with minimum statistics ranging from 1.400−3.00, mean statistics ranging from 3.540−3.891. The skewness and kurtosis coefficients of the entire questionnaire were acceptable with the former ranging from 0.027 to -0.407 and the latter ranging from -0.006 to 1.056. In addition, it was calculated that each Cook's distance values of

160 cases were less than 1.0. Meanwhile Box's Test of Equality of Covariance Matrices caused Box's M=54.815 with P=.427>.05, at no significance. So it can be accepted the data were normally distributed and there were homogeneity of variances. Therefore, MANOVA were used in the statistical analyses of effects of learning APP on the twelve sub dimensions of new media literacy (NML) of PCLT.

Table 5: MANOVA results related to time duration of learning App use efficacy on the twelve dimensions of new media literacy of prospective rural Chinese language teacher.

Variance Source	Dependent Variable	df						SSCP Matrix							F	Sig	Wilks' Lambda
Between Groups	play	3	3.839	3.935	2.535	4.514	2.431	3.061	2.802	3.978	4.443	3.526	4.014	4.04	4.303**	0.006	0 . 7 0 5 *
	simulation	3	3.935	4.272	2.749	4.572	2.452	3.476	3.002	4.048	4.648	3.883	3.873	3.841	4.952**	0.003	
	performance	3	2.535	2.749	1.777	2.998	1.551	2.275	1.957	2.622	2.932	2.577	2.531	2.501	1.551n. s. p	0.204	(converted
	appropriation	3	4.514	4.572	2.998	5.707	2.663	3.802	3.443	4.786	4.764	4.657	5.025	4.995	6.028***	0.001	F = 1 . 4 9 6
	distributed cognition	3	2.431	2.452	1.551	2.663	1.655	1.731	1.658	2.471	3.031	1.883	2.451	2.518	2.146n. s. p	0.097	P = . 0 3 6)
	multitasking	3	3.061	3.476	2.275	3.802	1.731	3.129	2.548	3.203	3.354	3.612	3.037	2.919	3.358*	0.02	
	collective intelligence	3	2.802	3.002	1.957	3.443	1.658	2.548	2.197	2.934	3.092	2.983	2.913	2.866	2.937*	0.035	
	judgment	3	3.978	4.048	2.622	4.786	2.471	3.203	2.934	4.153	4.479	3.771	4.255	4.271	5.291**	0.002	
	trans-media navigation	3	4.443	4.648	2.932	4.764	3.031	3.354	3.092	4.479	5.678	3.534	4.27	4.363	5.064**	0.002	
	networking	3	3.526	3.883	2.577	4.657	1.883	3.612	2.983	3.771	3.534	4.393	3.782	3.628	4.325**	0.006	
	negotiation	3	4.014	3.873	2.531	5.025	2.451	3.037	2.913	4.255	4.27	3.782	4.603	4.642	4.664**	0.004	
	visualization	3	4.04	3.841	2.501	4.995	2.518	2.919	2.866	4.271	4.363	3.628	4.642	4.712	5.275**	0.002	
Within Groups	play	156	46.392	19.884	21.134	19.054	20.06	21.714	15.406	15.174	13.091	15.677	14.532	15.033			
	simulation	156	19.884	44.866	25.885	20.064	14.566	11.831	14.534	9.368	13.268	11.323	13.084	7.823			
	performance	156	21.134	25.885	59.559	27.202	12.402	20.294	9.943	9.719	14.196	15.107	14.381	13.041			
	appropriation	156	19.054	20.064	27.202	49.237	18.901	19.638	13.341	11.674	23.832	22.411	18.903	20.992			

distributed cognition	156	20.06	14.566	12.402	18.901	40.113	22.672	19.846	20.638	19.838	13.586	19.612 18.819
multitasking	156	21.714	11.831	20.294	19.638	22.672	48.446	14.972	18.629	16.149	16.175	20.373 17.981
collective intelligence	156	15.406	14.534	9.943	13.341	19.846	14.972	38.907	22.106	20.684	15.745	22.455 18.854
judgment	156	15.174	9.368	9.719	11.674	20.638	18.629	22.106	40.82	25.58	20.026	30.82 28.079
trans-media navigation	156	13.091	13.268	14.196	23.832	19.838	16.149	20.684	25.58	58.309	32.129	30.057 27.667
networking	156	15.677	11.323	15.107	22.411	13.586	16.175	15.745	20.026	32.129	52.817	29.479 20.195
negotiation	156	14.532	13.084	14.381	18.903	19.612	20.373	22.455	30.82	30.057	29.479	51.313 33.531
visualization	156	15.033	7.823	13.041	20.992	18.819	17.981	18.854	28.079	27.667	20.195	33.531 46.444

*p < .05   **P< .01   ***P < .001   n. s. p > .05

Table 5 was results of MANOVA. It showed the value of Wilks' Lambda=0.705 which was converted to F value =1.496 with P=0.036 < .05 at a significant level. It indicated that the different duration of learning App use was significantly different in at least one of the twelve dimensions of new media literacy (NML). According to a series of ANOVA, it was found that play (F=4.303, P=.006 < .05）, simulation (F=4.956, P=.003 < .05）, appropriation (F=6.028, P=.001 < .05), multitasking (F=3.358, P=.02 < .05),collective intelligence (F=2.937, P=.035 < .05), judgment (F=5.291, P=.002 < .05), trans-media navigation (F=5.064, P=.002 < .05), networking (F=4.325, P=.006 < .05), negotiation (F=4.664, P=.004 < .05), visualization (F=5.275, p=.002 < .05) were significant at .05 level. These implied that duration of learning App use have significant efficacy on the ten dimensions of NML among PCLT. However, it can be seen that performance (F=1.551, P=.204 > .05), distributed cognition (F=2.146, P=.097 > .05), out of the 12 dimensions of NML were no significant at .05 level. These indicated that duration of learning App use has no significant efficacy on the two dimensions of NML among PCLT.

Table 6: Summary of ANOVA and Post Hoc Test results related to time duration of learning App use impact on the twelve dimensions of new media literacy of prospective rural Chinese language teachers.

Variance Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observed Power[a]	Post hoc test
Time duration (Between groups)	play	3.839	3	1.28	4.303**	0.006	0.076	0.859	D>A D>B
	simulation	4.272	3	1.424	4.952**	0.003	0.087	0.907	D>A D>B
	appropriation	5.707	3	1.902	6.028***	0.001	0.104	0.955	D>A D>B
	multitasking	3.129	3	1.043	3.358*	0.02	0.061	0.753	No means difference
	collective intelligence	2.197	3	0.732	2.937*	0.035	0.053	0.689	No means difference
	judgment	4.153	3	1.384	5.291**	0.002	0.092	0.926	D>A D>B
	trans-media navigation	5.678	3	1.893	5.064**	0.002	0.089	0.913	D>A D>B
	networking	4.393	3	1.464	4.325**	0.006	0.077	0.861	C>A C>B
	negotiation	4.603	3	1.534	4.664**	0.004	0.082	0.888	D>A D>B
	visualization	4.712	3	1.571	5.275**	0.002	0.092	0.925	D>A D>B
Error (Within groups)	play	46.392	156	0.297					
	simulation	44.866	156	0.288					
	appropriation	49.237	156	0.316					
	multitasking	48.446	156	0.311					
	collective intelligence	38.907	156	0.249					
	judgment	40.82	156	0.262					
	trans-media navigation	58.309	156	0.374					
	networking	52.817	156	0.339					
	negotiation	51.313	156	0.329					
	visualization	46.444	156	0.298					

*p < .05   **P< .01   ***P < .001   a. Computed using alpha = .05

According to Table 6, it can be seen that both multitasking and collective intelligence out of ten sub dimensions of NML have lower 0.8 in the observed power and no means difference in Post hoc test But the other seven sub dimensions results of the series of ANOVA and Post Hoc Test were revealed that effect size statistics (partial eta squared) and comparison results of means values of different time duration variables were figured out.

For play (F=4.303, p< .05), it was observed that the effect size (partial eta squared) was .076 with observed Power =.859, means differences of groups D>A, D>B. For simulation (F=4.952, p<.05), it was observed that the effect size (partial eta squared) was .087 with observed Power =.907, means differences D>A, D>B. For appropriation (F=2.96, p<.05) with observed Power

=.859, means differences of groups were D>A, D>B, it was observed that the effect size (partial eta squared) was .104. For judgment (F=5.291, p<.05) with observed Power =0.926, means differences D>A, D>B and the effect size (partial eta squared)=.092. For trans-media navigation (F=5.064, p < .05) with observed Power =.913, means differences D>A, D>B and the effect size (partial eta squared)= .089. For networking (F=4.325, p < .05) with observed Power=.861, means differences C>A, C>B and the effect size (partial eta squared)=.077. For negotiation (F=4.664, p < .05) with observed Power =.888, means differences D>A, D>B and the effect size (partial eta squared)= .082. For visualization (F=5.275, p < .05) with observed power =.925, means differences D>A, D>B.

According to Pallant that the obtained eta squared values were interpreted as .01=small effect, .06=moderate effect, .14=big effect [7]. Therefore, it can be said that time duration of learning App use has significant moderate efficacy on the overall new media literacy and the eight sub dimensions out of the 12 sub dimensions of new media literacy which were named play, simulation, appropriation, judgment, trans-media navigation, networking, negotiation, visualization.

According to honestly significant difference (HSD) of Post Hoc Test, it was observed that no significant difference existed between group C and group D among even sub dimensions named play, simulation, appropriation, judgment, trans-media navigation, negotiation, visualization out of the 12 dimensions of new media literacy. These mean that the efficacy of using learning App for 3-5 hours a week is no different from that of using learning App for more than 5 hours a week in seven sub dimensions of the 12 dimensions of the new media literacy. In other words, it may be more economical to spend 3-5 hours a week on learning App for more than 5 hours on it in post era of COVID-19.

5. RESEARCH CONCLUSION AND SUGGESTIONS

5.1. Research Conclusion

In this study, the efficacy of the usage of learning App on new media literacy of the prospective Chinese language teachers was explored. A cross-sectional survey was conducted on 160 prospective rural Chinese language teacher participants in the Departments of Literature and Journalism of Leshan Normal University in Southwest China. The study was based on the Jenkins et al.'s NML framework composed of the twelve sub dimension of new media literacy. Structured questionnaire was used as instrument of data collection. For the data analysis, a series of one-way analysis of variance (ANOVA), multivariate analysis of variance (MANOVA), Post Hoc Test were used. The findings of this study showed the duration of learning App use has significant moderate efficacy on the overall new media literacy and its eight sub dimensions called play, simulation, appropriation, judgment, trans-media navigation, networking, negotiation, visualization among the prospective rural Chinese language teachers. In addition, an interesting phenomenon was found that the use of learning App did not change significantly new media literacy levels and its sub dimensions after a specific period of time except the sub dimension of networking.

5.2. Suggestions

In view of the significant positive moderate efficacy of learning App on the overall new media literacy and its sub-dimensions called play, simulation, appropriation, judgment, trans-media navigation, networking, negotiation, visualization, educators and computer designers of online curriculum design can consciously and appropriately integrate learning App into online learning or blended learning to develop students' new media literacy. In this study, there was almost no significant difference in the results of most dependent variables between group C and Group D. Therefore, it is suggested that educators and relevant information technology personnel can consciously and appropriately design the time variables used in learning App in network literacy activities, so as to learn more economically.

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