STUDENTS' SATISFACTION ON HYBRID LEARNING OF ANIMATION MAJOR UNDERGRADUATE STUDENTS IN CHENGDU, CHINA

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Abstract

The study was designed to explore factors influencing the satisfaction of animation undergraduates from Chengdu universities with hybrid learning. First, the conceptual framework in the study was based on three-tier use the model (3-TUM) and the information systems (IS) success model, including Self-efficacy (SE), System quality (SYQ), Information quality (IQ), Service quality (SQ), Perceived value (PV) and Satisfaction (SAT). It also presented relationships between influencing factors in the model. The researcher took an approach of judgement and quota samplings to verify the model by drawing 497 animation undergraduates from three public universities in Chengdu for quantitative research, with questionnaires to collect data. Second, confirmatory factor analysis (CFA) and structural equation model (SEM) were employed for data analysis, including goodness of fit, validity and reliability of structure. The criterion for model fit index was CMIN/DF<3.00, GFI≥0.90, AGFI≥0.80, RMSEA<0.05, CFI≥0.90, NFI≥0.90, TLI≥0.90. Model fit indexes of the adjusted CFA and SEM are within such standards. The above analysis contributed to the extent of influencing relations between various factors: service quality had the biggest positive effect on animation undergraduates' satisfaction

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with hybrid learning with standardized path coefficient value of 0.429 (t=9.058***) and had the minimal impact on perceived value as marked by standardized path coefficient being 0.182 (t=3.962***). Perceived value has a direct implication for satisfaction, as evidenced by the standardized path coefficient of 0.275 (t=6.357***). Self-efficacy had a positively strong implication for students' satisfaction with hybrid learning, which served as the second-leading factor influencing satisfaction with a standardized path coefficient of 0.379 (t=9.398***). Meanwhile, students' satisfaction with hybrid learning was influenced by information quality and system quality, with the standardized path coefficient of 0.316 (t=8.128***) and 0.264 (t=6.053***) respectively. The study revealed that we need to take into account factors influencing students' satisfaction with hybrid learning in ways that make their learning more enjoyable. Learning atmosphere for hybrid learning must be refined for better effect and satisfaction.

Keywords: Students' satisfaction, Hybrid learning, Animation major, Undergraduate student

Introduction

Recent years have seen rapid growth in the Chinese animation industry. China's animation industry was worth RMB 194.1 billion yuan in 2019 (Lisa, 2021). Given sizeable skills gap, education in animation is even more important. However, China's recent education in animation appears to be "saturated", challenged by disparities in development. On the one hand, the thriving animation industry requires plenty of talents; but on the other, students majoring in animation fail to meet the needs of such industry (Yang, 2019). The education on animation needs reform urgently. Hybrid learning acts as a major direction for animation education. Currently, most of research on hybrid learning stays at the application level of professional technology, with few discussions and research on learners' satisfaction with the hybrid learning. As such, it is essential to analyze relative factors influencing students' satisfaction with hybrid learning through the lens of learners, which is also a field that needs to be explored in the research of animation education at the present stage. Hybrid learning means that choosing appropriate content and methods for teaching the right people at the right time. It seeks to

achieve organic integration of advantages by discarding deficiencies in various teaching concepts, media and styles (Mansour & Mupinga, 2007). Undergraduates' satisfaction refers to a general evaluation of the experience of their learning and life in the light of their expectation of education, which has close association with their behavioral enthusiasm and psychological health as well as the development of universities (Liaw & Huang, 2013; Johnson et al., 2008). A focus on undergraduates' satisfaction with learning marks the product of higher education to some historical stage, which is an important signal of the degree of higher education development and maturity of colleges and universities (Jia et al., 2021). Students' satisfaction has an important implication for the process, result and quality of learning. The investigation and research on animation students' satisfaction can offer an assessment of the teaching and learning process. Students' comments can be seen as a basis for improvement so that the interaction between teaching and learning can be better enhanced, so do students' learning efficiency and quality. Therefore, the thesis aims to discuss factors that have an implication for the satisfaction of animation undergraduates from Chengdu public universities with hybrid learning.

The researcher chooses factors suitable for the study in the light of previous research results. Cigdem and Ozturk (2016) analyzed factors influencing students' inclination for LMS in Turkish secondary vocational schools. The study employs 3-TUM to test students' satisfaction with LMS and their behavioral intentions. It retains self-efficacy and satisfaction of 3-TUM for analyzing factors influencing animation undergraduates' satisfaction with hybrid learning. Chen et al. (2015) applied the success model of the DeLone and McLean information systems (D&M IS) to research factors influencing readers' satisfaction under the comprehensive learning environment based on an electronic portfolio backed by library resources. The researcher chooses information quality, system quality and satisfaction in the study. Clemes et al. (2013) analyzed relationships among behavioral intention, satisfaction, service quality, perceived value and university images. According to the demographics of samples (gender, age, period of schooling and major), the study compares students' cognition about service quality, overall

perceived service quality, university images, satisfaction and good behavior intention. At last, the researcher retains service quality, perceived value and satisfaction as factors that are used to analyze influencing elements.

The researcher reckons that system quality, service quality, perceived value, information quality and self-efficacy may imply animation undergraduates' satisfaction with hybrid learning.

Materials and methods

1. Conceptual Framework

Conceptual framework develops based on previous academic research frameworks, with 3-TUM and IS success model as basis, as shown by Figure 1.

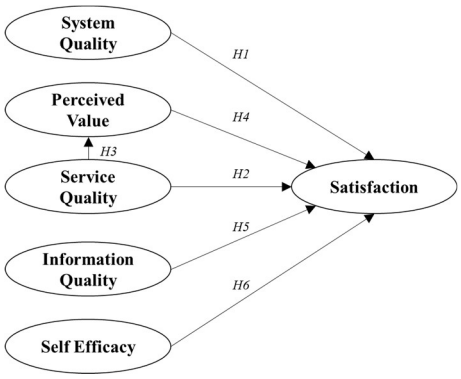

Figure 1 A Conceptual framework of satisfaction to hybrid learning

2. Research Methodology

The researcher sends questionnaires to animation undergraduates from three public universities in Chengdu, China, as it works to make a non-experimental quantitative study and gather data. The investigation falls into the screening question, demographic information and five-point Likert scale measurement. Three experts tested the index of item-objective congruence (IOC) before collecting data. The calculation reveals that out of 26 items in 6 structures containing all variables, the highest score of 20 is 1 and the lowest one of 6 is 0.67, which is up to the minimum standard of judgment and meets content validity. The researcher invites 30 participants to a pilot test to determine the reliability of instruments. In the

Cronbach's alpha (CA) reliability test, 30 participants scored 0.847 for service quality, 0.900 for perceived value, 0.829 for system quality, 0.747 for information quality, 0.849 for self-efficacy and 0.866 for satisfaction. The estimation of the overall reliability of the six structures is 0.840. It is acceptable for all values as 0.70 or above (Hair et al., 2007). In quantitative research, normality tests are employed to identify whether the distribution of each variable is normal or not. Skewness and kurtosis are used to consider the normality of each variable in the study. The total average of skewness is -0.145 which means a negative skew. The total average of kurtosis is -0.725 which suggests that the data set is considered acceptable as a normal distribution (Dugar, 2018). In the study, the correlation matrix acts as a tool to define multicollinearity, measured by tolerance of all variables. The entire tolerance of all variables ranges from 0.165 to 0.541. The result of multicollinearity for each pair of latent variables is below 0.800, which indicates non-violation of multicollinearity (Shrestha, 2020).

3. Population and Sample size

Subjects in the study are animation undergraduates from representative universities such as Chengdu University (CDU), Sichuan Conservatory of Music (SCM), and Southwest Minzu University (SMU). The researcher calculates sample capacity by taking the sample size computer of the Structural Equation Model in the light of the number of latent variables (6) and observed (26) one. The result indicates that the sample size should be at least 403. In the previous research, researchers usually increased the sample size by 10%-20% to make up for invalid questionnaires (Israel, 1992). For this reason, the researcher increases sampling population by 20%, receiving 497 copies from three public universities in Chengdu.

4. Sample Technique

The techniques of judgement and quota samplings are employed. The researcher takes an approach of judgement sampling to choose 890 undergraduates educated in hybrid learning for at least one month from three targeting universities, followed by 497 samples through quota sampling. Details are shown in Table 1.

Table 1 Proportion of grades in quota sampling

		Chengdu University (CUD)	Sichuan Conservatory of Music (SCM)	Southwest Minzu University (SMU)
		Sample Size		
Grade	Freshman	45	40	22
	Sophomore	47	51	31
	Junior	49	57	30
	Senior	49	47	29
	Total	**190**	**195**	**112**

Results

1. Demographic Information

The demographic data reveals that most of the respondents are girls accounting for 60.1%, compared with 39.8% for boys. In the statistics of universities where respondents attend, Chengdu University (CDU), Sichuan Conservatory of Music (SCM), and Southwest Minzu University (SMU) make up 38.2%, 39.2% and 22.5%, respectively. During the school year, 21.1% of participants are freshmen, with 26.1% for sophomores, 27.6% for juniors and 25.2% for seniors. Going forward, in terms of professional division, 19.7% of the respondent study 2D animation, 24.7% in 3D animation, 5.2% in stop-motion animation and 28.8% in cartoon. The other 21.5% of the students have not clearly chosen their major field.

2. Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis is applied to confirm whether the construction and loadings of observed variables are in line with expectation on the basis of theory or hypothesis (Malhotra et al., 2004). The factor loading of each observed variable and admissible values exhibit the goodness of fits of research matrix in a remarkable way (Hair et al., 2006). The researcher modifies the result by SPSS AMOS and uses the chi-square value to check the degree of freedom, with the value of Chi-square as 616.541 and that of Degrees of freedom as 281, scoring 2.194 on CMIN/DF, which is lower than 3.00 (Hair et al., 2006). The goodness-of-fit index (GFI) is 0.913 more than 0.90 (Hair et al., 2006). The adjusted goodness of-fit

index (AGFI) is 0.892 greater than 0.80 (Filippini et al., 1998), The comparative fit index (CFI) is 0.959 bigger than 0.90 (Hair et al., 2006). The normalized fit index (NFI) is 0.928 almost equal to 0.90 (Hair et al., 2006). The root mean square error of approximation (RMSEA) is 0.049, which is less than 0.05 (Browne & Cudeck, 1993). As such, CFA testing reveals that all these indicators of the goodness of fits are acceptable. Table 2 shows goodness of fit results of CFA before and after adjustment and Figure 2 reveals the adjusted CFA matrix.

Table 2 The Goodness of Fit Results Before and After Adjustment for CFA

Categories	GOF Indices	Criteria	Source	Before Adjustment	After Adjustment
Absolute Fit	CMIN/DF	<3.00	Hair et al. (2006)	2.359	2.194
Indices	GFI	≥0.90	Hair et al. (2006)	0.905	0.913
	AGFI	≥0.80	Filippini et al. (1998)	0.882	0.892
	RMSEA	<0.05	Browne and Cudeck (1993)	0.052	0.049
Incremental	CFI	≥0.90	Hair et al. (2006)	0.953	0.959
Fit Indices	NFI	≥0.90	Hair et al. (2006)	0.922	0.928

Remark CMIN/DF=The Ratio of the Chi-Square Value to Degree of Freedom, GFI=Goodness-of-Fit Index, AGFI= Adjusted Goodness-of-Fit Index, RMSEA= Root-Mean-Square Error of Approximation, CFI= Comparative Fit Index, NFI=Normed Fit Index.

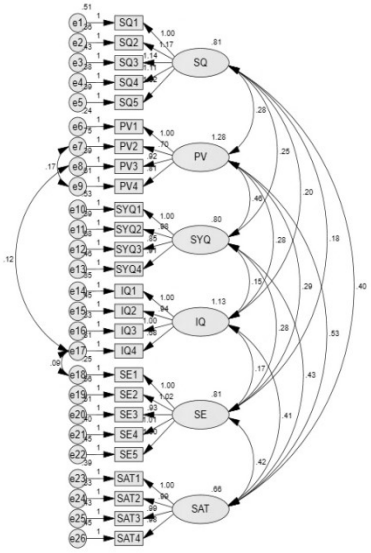

Figure 2 The adjusted measurement model

The statistical results in Table 3 indicate that all values of Cronbach's Alpha are greater than 0.80, factor loadings bigger than 0.50, composite reliability (CR) above 0.70 and Average variance extracted (AVE) greater than 0.50 (Fornell & Larcker, 1981). It is significant in all evaluation.

Table 3 Confirmatory factor analysis result, Composite Reliability and Average Variance Extracted

Latent Variables	Source of Questionnaire	No. of Items	Cronbach's Alpha	Factors Loading	CR	AVE
Service Quality	Chen et al., (2013)	5	0.920	0.784-0.868	0.920	0.697
Perceived Value	Chang (2012)	4	0.885	0.673-0.919	0.881	0.653
System Quality	Tam et al., (2019)	4	0.841	0.677-0.814	0.845	0.577
Information Quality	Ofori et al., (2017)	4	0.872	0.627-0.879	0.882	0.654
Self-efficacy	Sean (2012)	5	0.902	0.762-0.874	0.904	0.652
Satisfaction	Lwoga (2013)	4	0.866	0.765-0.816	0.868	0.621

The convergent validity is confirmed on the condition that CR is bigger than AVE and AVE greater than 0.50 (Hair et al., 2013). In Table 4, the values of the discriminant validity are above the critical value through examination. As such, the convergent validity and discriminant validity are guaranteed in the study. Besides, evaluation results of these matrixes appear to confirm discriminant validity and validation, thus evaluating the validity of the subsequent structural model.

Table 4 Discriminant validity

Correlation	SQ	PV	SYQ	IQ	SE	SAT
SQ	0.835					
PV	0.225	0.808				
SYQ	0.305	0.420	0.759			
IQ	0.176	0.231	0.165	0.809		
SE	0.206	0.292	0.317	0.215	0.807	
SAT	0.497	0.541	0.524	0.438	0.518	0.788

Remark The diagonally listed values are the AVE square roots of the variables

3. Structural Equation Model (SEM)

The researcher uses a structural equation model to calculate a given system of linear equation following CFA process in ways to verify the fitting of

model. With the structural equation model, a causal link can be determined between variables in a given matrix, including estimated inaccuracy or unreliability of relevant coefficients (Kline, 2016). It is generally reasonable to employ the structural model in social sciences, for it serves as a way to recognize latent variables. These variables are regarded as existent while invisible in reality. The results including values of CMIN/DF, GFI, AGFI, CFI, NFI and the RMSEA are modified by SPSS AMOS, the value of Chi-square is 624.773, the value of Degrees of freedom is 284, as shown in Table 5. The adjusted structural equation is shown in Figure 3. As such, each indicator relevant to the goodness of fit is acceptable through SEM verification in the study.

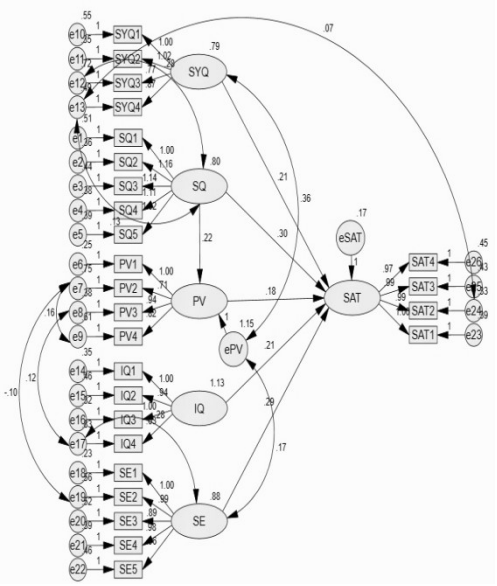

Figure 3 The adjusted structural equation model

Table 5 Goodness of fit for structural equation model

Index	Criterion	Source	Before Adjustment	After Adjustment
CMIN/DF	<3.00	Hair et al., (2006)	3.022	2.200
GFI	≥0.90	Hair et al., (2006)	0.876	0.911
AGFI	≥ 0.80	Filippini et al., (1998)	0.851	0.891
CFI	≥ 0.90	Hair et al., (2006)	0.064	0.959
NFI	≥ 0.90	Hair et al., (2006)	0.928	0.927
RMSEA	< 0.05	Browne & Cudeck (1993)	0.896	0.049

4. Hypothesis Testing Results

Research matrix is applied to calculate the significance of each variable under the variance calculation of standardized path coefficient, as seen in Table 4. Service quality has the biggest implication for Satisfaction, as evidenced by the standardized path coefficient (β) result of 0.429 (t-value = 9.058***). The influence of Self-Efficacy on Satisfaction is marked by β= 0.379 (t-value = 9.398***), followed by the effect of Information Quality on Satisfaction shown by β = 0.316 (t-value = 8.128***). Perceived Value has a bearing on Satisfaction, marked by β = 0.275 (t-value = 6.357***). The effects of System Quality and Service Quality on satisfaction are seen by β=0.264 (t-value = 6.053***) and β = 0.182 (t-value = 3.962***) respectively. As such, all hypotheses are backed remarkably, with a value p less than 0.05.

Table 6 Hypothesis result of the structural equation model

Hypotheses	Paths			Standardized Path Coefficient (β)	S.E.	T-Value	Test Results
H1:	SYQ	→	SAT	0.264	0.035	6.053***	Supported
H2:	SQ	→	SAT	0.429	0.033	9.058***	Supported
H3:	SQ	→	PV	0.182	0.056	3.962***	Supported
H4:	PV	→	SAT	0.275	0.028	6.357***	Supported
H5:	IQ	→	SAT	0.316	0.026	8.128***	Supported
H6:	SE	→	SAT	0.379	0.031	9.398***	Supported

Remark *** p<0.001, ** p<0.01, * p<0.05

Discussions

The entire hypotheses have been supported based on above results, with details as given below. Hypothesis 1_a presents a prominently causal relationship between system quality (SYQ) and satisfaction (SAT). The calculation result shows a proactively statistical correlation between system quality (SYQ) and satisfaction (SAT) for students majoring in animation who are educated in hybrid learning, with a standardized path parameters of 0.264 and a t-value of 6.053***. As such, $H1_a$ is supported and $H1_0$ is denied. Abundant researches reveal that system quality has an implication for satisfaction (DeLone & McLean, 2003; Bauer et al., 2006). Wu and Wang (2006) also pointed out that system quality enhanced people's satisfaction with such a system.

Hypothesis 2_a offers a remarkably causal relationship between service quality (SQ) and satisfaction (SAT). The computed result indicates an actively statistical dependence between service quality (SQ) and satisfaction (SAT) for animation students educated in hybrid learning, marked by a standardized path parameter of 0.429 and a t-value of 9.058***. Therefore, $H2_0$ is denied and $H2_a$ is supported. Under the circumstance of hybrid learning, service quality has a significant impact on students' satisfaction (Masrek et al., 2010).

Hypothesis 3_a presents a prominent causality between service quality (SQ) and perceived value (PV). The result shows an actively statistical dependence between service quality (SQ) and perceived value (PV) for students majoring in animation who are educated in hybrid learning, as evidenced by a standardized path parameter of 0.182 and a t-value of 3.962***. For this reason, $H3_0$ is denied and $H3_a$ is supported. In the same way, Tam (2004) reckoned that people's perceived value of service was higher when they felt that service quality considerably surpassed service cost.

On top of that, Hypothesis 4_a offers a remarkable causality between perceived value (PV) and satisfaction (SAT). The result reveals a proactive statistical correlation between perceived value (PV) and satisfaction (SAT) for animation undergraduates educated in hybrid learning, with a standardized path parameter of 0.275 and a t-value of 6.357***. As such, $H4_a$ is supported and $H4_0$ is denied. Tam (2004) also believed that perceived value played a decisive role in influencing satisfaction. Tam (2004) also believed that perceived value determined satisfaction.

Hypothesis 5_a presents a notably causal relationship between information quality (SQ) and satisfaction (SAT). The result indicates an actively statistical dependence between information quality (SQ) and satisfaction (SAT) for animation undergraduates educated in hybrid learning, marked by a standardized path parameter of 0.318 and a t-value of 8.128***. Therefore, $H5_0$ is denied and $H5_a$ is supported. Wang et al. (2007) pointed out that information quality played a leading role in influencing one's satisfaction.

At last, hypothesis 6_a offers a prominent causation between self-efficacy (SE) and satisfaction (SAT). The result shows a proactive statistical correlation between self-efficacy (SE) and satisfaction (SAT) for students majoring in animation who are educated in hybrid learning, as evidenced by a standardized path parameter of 0.379 and a t-value of 9.398***. As such, $H6_a$ is supported and $H6_0$ is denied. It is found that self-efficacy has positive correlation with students' satisfaction (Klassen & Chiu, 2010; Yang 2010; Hong et al., 2016).

Conclusions

1. Conclusions

First, system quality under hybrid learning has a positive implication for students' satisfaction. The conclusion is in line with basic model of IS Model, illustrating that the more stable and flexible the hybrid learning platform works, the higher the students' satisfaction will be. As a significant player, the system quality of hybrid learning contributes positively to students' satisfaction. Second, service quality of hybrid teaching positively affects on students' satisfaction and perceived value. The conclusion accords with basic model of IS Model, which shows that in hybrid teaching, service quality is the base and has a positive implication for students' perceived value and satisfaction. Third, students' perceived value has a positive influence on students' satisfaction. The conclusion tallies with hypothesis, indicating that students' satisfaction will be enhanced if they can feel sense of self-worth in hybrid learning. Fourth, information quality of hybrid learning has a positive implication for students' satisfaction. The conclusion conforms to the basic model of IS Model. It shows that students will be more satisfied with learning and more active in their studies if they are well-positioned to acquire information in an easy, accurate and timely way. Last, self-efficacy will contribute positively to satisfaction. The conclusion conforms to the basic model of 3-TUM. According to such conclusion, students argue that hybrid learning will make them improve their academic performance.

2. Recommendations

The researcher has an analysis of factors influencing animation undergraduates' satisfaction with hybrid learning It is suggested that teachers should consider these factors in the hybrid teaching of animation majors, making full use of advantages of the hybrid teaching and establishing the teaching platform better. In so doing, students can find proper learning methods, thus achieving self-realization and finding contentment in learning. Besides, it is essential to make students feel more satisfied with hybrid learning by refining the structure of hybrid teaching. Self-efficacy has a positive implication for satisfaction. Students argue that they can improve academic performance through hybrid learning, thus improving their professional skills. In this connection, teachers need to enhance students' satisfaction by experiencing hybrid learning, thus lifting students' professional competence and learning efficiency.

3. Limitation and Further Research

First, the object and number of samples can be further increased. In the study, objects of investigation come from three public universities in Chengdu, China. In future research, the targets can be gradually extended to other regions and the sample size can also be increased. Second, the conceptual model can be extended. Other latent variables can also be explored, including performance expectations, trust, technology, University image and actual usage. Third, it will be better to study the ideal characteristics of animation undergraduates. Last, overseas references available on animation hybrid teaching are relatively sparse. With the increasing academic research on the animation industry, the model constructed in the study will be gradually refined.

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