A Study of Interactive Style on Students Loyalty in Science Technology Education: Moderating of Management Level

Xin He
School of Management, Lanzhou University, Lanzhou, Gansu,730000, China

Shi-Zheng Huang
School of Economics and Management, Guangdong University of Petrochemical Technology, Maoming 525000, China

Tong Li
School of Management, Lanzhou University, Lanzhou, Gansu,730000, China

Kou Zhao
School of Management, Lanzhou University, Lanzhou, Gansu,730000, China

ABSTRACT
The cultivation of student loyalty is an important topic in higher education reform, while the theoretical modeling and evidence for the effect of teachers' interaction styles on student loyalty are seldom discussed. Based on Social Exchange Theory, Theory of Empathy, and the effect of power on pro-social behavior, 359 science & technology management master students in China are sampled in this study. With Hierarchical Regression Analysis, the conclusions are summarized as following. Interaction- and task-oriented interaction shows positive correlations with student loyalty, self-oriented interaction presents negative correlations with student loyalty, satisfaction reveals mediation on the relationship between the three interaction styles and student loyalty, and the mediation of satisfaction on the relationship between interaction- and task-oriented interaction and student loyalty is moderated by science & technology management master students' management level. This study expands the theoretical framework of perceived interaction and student loyalty and provides decision-making reference for higher education service institutions cultivating student loyalty.

Keywords: science & technology management, interaction styles, student satisfaction, student loyalty, moderation and mediation

INTRODUCTION

For higher education service institutions, possessing student groups with high loyalty is the key to remain or win competitive advantages. On one hand, student loyalty is the embodiment of students' participation ability and level as well as the evaluation and judgment of the capacity and level of a college's education development and society service. Student groups with high loyalty would be glad to recommend the colleges and universities and the word-of-mouth could promote the brand effect. On the other hand, students with high loyalty would continuously support the alma mater after the graduation, such as monetary support (donations or sponsoring scientific research projects) and offering employment opportunities or proceeding interview workshops for students in the alma mater. Such cumulative alumni resources could largely enhance the social influence of higher education service

Correspondence: Shi-Zheng Huang, *School of Economics and Management, Guangdong University of Petrochemical Technology, Maoming 525000, China.*
✉ szhuang06@gmail.com

State of the literature

- Science & technology management education is an important driving force to promote industry upgrading and emerging industries in the world and of regional economic development.
- The research objectives contain to discuss the relationship between teachers' interaction styles and student satisfaction, student loyalty, the mediation of student satisfaction on teachers' interaction styles and student loyalty, and the moderation and mediation of science & technology management master students' management level, in consideration of the in-service feature of hierarchy effect of science & technology management master students.

Contribution of this paper to the literature

- Differentiation function of servers' interaction styles on student loyalty should be thoroughly understood.
- Each student's service requirements should be emphasized to effectively evaluate students' service satisfaction. A healthy service feedback mechanism to encourage students thoroughly expressing the service appeals is necessary, and student satisfaction with personalized needs is regarded as the quality standard of service work.
- For science & technology management master students, the management level is the degree of power which would weaken the interaction and the effect of task-oriented interaction on student loyalty.

institutions (Hennig-Thurau, Langer & Hansen., 2001). Although the development of higher education in China is later than it in western developed countries, the Chinese Government highly stresses on the quality of higher education in the 21st century and proposes to establish "Double First-rate Universities". The primary function of student loyalty on higher education reform is therefore discussed.

Essentially, educational service is an interaction process, and interaction quality determines whether teaching service organizations could effectively acquire the deep information of students and the service requirements to further create the unique school experience. For this reason, interaction quality is a key factor in satisfaction and loyalty. Students' perceived interaction styles of teaching service staff reflect the interaction quality to further affect student loyalty. From current research on the formation of student loyalty, past research mainly investigated the functions of teaching quality, reputation of teaching institutions, image of universities, and service quality on student loyalty (Helgesen & Nesset, 2007; Thomas, 2011; Wu & Tai, 2016), but seldom studied the effect of student-teacher service interaction on student loyalty, from the perspective of student perception. From the aspect of relationship marketing, student-teacher interaction could affect student loyalty as the relationship quality between teachers and students as well as teaching institutions and students changes with changing interaction quality. The fundamentality of relationship quality lies in student satisfaction with teaching service. Merely the satisfactory service interaction relationship could really enhance student loyalty to education institutions. Chen (2016) pointed out the mediation of relationship quality on the relationship between service marketing mix and student loyalty, and a lot of researchers proved the effect of satisfaction on loyalty (Fornell et al. 1996; Petrick & Backman, 2001). Customer satisfaction as the essential condition of customer loyalty has been commonly agreed. The logic chain of perceived interaction-student satisfaction-student loyalty therefore presents powerful theoretical basis. However, research on the moderation of management level to the mediation of learning satisfaction in higher education service situations is seldom discussed.

Science & technology management education is an important driving force to promote industry upgrading and emerging industries in the world and of regional economic development. Science & technology management is the bridge between technology and management about knowledge and practice, aiming to smooth the gap between the two and to solve problems like integrating technology development into the overall strategic objective of an organization, rapidly accelerating the adoption of technology to enhance the efficacy, and evaluating technology and completing technology transfer (Huang, Wu & Tsai, 2016; Wu & Tai, 2016); any technology related management issues are covered. In comparison with western developed countries, science & technology

management education in China is late and the courses are mainly for master students. Science & technology management is an interdisciplinary discipline combining technology and management. Universities also present diverse development, and the courses stress on the combination with practice and are the key point of science & technology management education in China. Nevertheless, it is lack of research on the effect of teachers' interaction styles on student loyalty.

Based on above background and the research gap, science & technology management master students are regarded as the research samples to prove the "perceived interaction—student satisfaction—student loyalty" model by introducing service interaction styles from the construct of western marketing and transforming to teaching service fields. The research objectives contain to discuss the relationship between teachers' interaction styles and student satisfaction, student loyalty, the mediation of student satisfaction on teachers' interaction styles and student loyalty, and the moderation and mediation of science & technology management master students' management level, in consideration of the in-service feature of hierarchy effect of science & technology management master students. It is expected that the research conclusions could further enrich the theoretical framework of the research on the effect of student loyalty and perceived interaction, interaction styles so as to provide the decision-making reference for higher education institutions in developing countries effectively cultivating student loyalty.

THEORY AND HYPOTHESIS INFERENCE

Teachers' Interaction Styles and Student Satisfaction

Perceived interaction, under customer perspective, contains general sense and special sense. The "service interaction" idea proposed by Shostack (1985) included the interaction between customers and service staff as well as the interaction between customers and equipment, other tangible objects. In addition to traditional meaning of interaction between customers and employees, customers and service systems, as well as customers and physical environments, service interaction should cover the interaction among customers. In this case, perceived interaction, in general sense, contains the interaction between customers and organizations, customers and service staff, as well as among customers. Customers' perceived interaction, in special sense, indicates the interaction between customers and service organizations or front-line service staff (Wu, Tsai & Tai, 2016). Collins' "Interaction Ritual Chains" combined the essence of service interaction, discussed customers' perceived contents and structure of the interaction between customers and enterprises under service situations, and regarded such perceived interaction as customer perception of acquiring affective energy and symbolic capital in the service interaction (Wu et al., 2016). It included three key dimensions of interaction intention, interaction professionalism, and interaction affection. From the aspect of service providers' interaction styles, Sheth (1976) divided customers' perceived interaction into interaction-oriented interaction, task-oriented interaction, and self-oriented interaction. Such a division was approved by researchers and supported by relevant empirical research. Referring to Sheth's (1976) definition and division, "teachers' interaction styles" in this study is the perceived variable in the contact process of students and teachers that it is the special-sense perceived interaction. Student satisfaction refers to students' overall perception evaluation of the teaching service experience, and the measurement is referred to the second satisfaction measuring questions designed by Cronin et al. (2000).

Referring to Sheth's (1976) definition and division of perceived interaction, interaction-oriented interaction appears when students perceive teachers' efforts and the established good personal friendship and interactive atmosphere. Under such perceived interaction, students would receive good psychological experience and generate the sense of pleasure that interaction-oriented interaction would enhance student satisfaction. Task-oriented interaction aims to have students rapidly and well grasp relevant knowledge and skills. For students, the basic service requirement is to effectively grasp the most practical knowledge and skills. For this reason, task-oriented interaction would have students appear positive evaluation of servers and enhance the satisfaction. Furthermore, self-oriented interaction indicates that teachers are used to concentrate on themselves and concern about themselves but ignore students' feelings when contacting with students. Under such an interaction style, students acquire the worst school experience to result in negative evaluation of the service process. Accordingly, it is

considered in this study that teachers' interaction styles show positive effects on student satisfaction. The following hypothesis is then proposed.

H1a: Interaction-oriented interaction shows positive correlations with student satisfaction.

H1b: Task-oriented interaction presents positive correlations with student satisfaction.

H1c: Self-oriented interaction reveals negative correlations with student satisfaction.

Teachers' Interaction Styles, Satisfaction, and Student Loyalty

Oliver (1997) defined customer loyalty as a kind of deep commitment of customers. The content of commitment was to continuously repurchase the preferred products or services in the future. Environment changes and enterprises' marketing would potentially influence customers' changing behaviors (Wu et al., 2016). Oliver (1999) constructed a four-order model related to customer loyalty, including cognitive loyalty, affective loyalty, conative loyalty, and action loyalty. Comparing to customer loyalty, Hennig-Thurau, Langer & Hansen (2001) considered that student loyalty should contain attitudes and behaviors, which were highly correlated (Jacoby and Chestnut 1978). Student loyalty to education institutions did not simply refer to students continuously and regularly enjoying the service offered by education institutions, but covered students' active affection and attitudes towards education institutions. Such affection and attitudes induced students' loyal behaviors. Hennig-Thurau, Langer & Hansen (2001) measured student loyalty with "recommendation intention", "repurchase intention" (studying in the current college when choosing again), and "intention to be permanently associated with the education institution". The above definitions and measurement methods are also applied to this study.

In comparison with other types of service products, higher education service presents stronger interpersonal interaction, where a temporary social environment is composed of students and teachers. Interaction-oriented interaction and task-oriented interaction respectively represent affective support and functional support from a teaching service organization. According to "principal of reciprocity" in Social Exchange Theory, students, after perceiving teachers' support and assistance and being satisfied, would generate the sense of obligation to the teaching service organizations and further appear intention or behaviors to reward the organizations. Theory of Empathy could also explain the relationship between interaction-/task-oriented interaction and student loyalty. Empathy refers to perceiving and understanding others and experiencing others' emotion and affection by stepping in others' shoes. An individual would appear the sense of pleasure and contentment, when being concerned, accepted, and respected, and would present "strong reward". When students perceive teachers' affective concerns and consider that teachers are attempting to establish the close personal relationship, or when students perceive teachers' dedicated attitudes and consider that they are doing their best to better grasp relevant knowledge, such interaction-oriented and task-oriented interaction styles would satisfy students to further show "empathy" on the teachers and the teaching service organizations and perform loyal attitudes and loyal behaviors to reward the teachers and the teaching service organizations. On the contrary, when teachers are used to concentrate on themselves, when contacting with students, ignore students' feelings, and perform self-oriented interaction styles, students, who could not receive the least satisfaction with the service requirements, would easily appear worse psychological experiences and negative emotions of complaint and loss to strongly inhibit the formation of loyalty. In sum, it is considered in this study that teachers' interaction styles, through the mediation of satisfaction, would affect student loyalty. The following hypotheses are therefore proposed.

H2a: Interaction-oriented interaction appears positive correlations with student loyalty.

H2b: Task-oriented interaction presents positive correlations with student loyalty.

H2c: Self-oriented interaction shows negative correlations with student loyalty.

H2d: Satisfaction mediates the relationship between interaction-oriented interaction and student loyalty.

H2e: Satisfaction mediates the relationship between task-oriented interaction and student loyalty.

H2f: Satisfaction mediates the relationship between self-oriented interaction and student loyalty.

Moderation of Management Level

Taking science & technology management master students as the research object and considering the effect of power on pro-social behavior, the management position and the management level of science & technology management master students would affect the relationship between interaction-oriented interaction, task-oriented interaction and student loyalty. From the content of power, high-power individuals present less pro-social behavior than low-power individuals do. Specifically speaking, high-power individuals, comparing to low-power ones, would seldom consider about other's feelings, comprehend problems from personal aspect, and show lower emotion identification (Tjosvold & Sagaria, 1978; Galinsky et al., 2006; Wu, Tsai & Yeh, 2014). Meanwhile, high-power individuals, in comparison with low-power ones, prefer to keep certain distance with others in the interpersonal interaction (Kipnis, 1972; Lammers et al., 2012; Magee & Smith, 2013).

As a result, science & technology management master students being at higher management level (high-power ones), comparing to those being at lower management level and even non-management position (low-power ones), would not appear more empathy on service providers after perceiving affective support and instrumental support from teaching service staff. Besides, the tendency of high-power ones preferring the interpersonal interaction to keep distance with others has them not appear more satisfaction on the close-distance behaviors of interaction-oriented and task-oriented interaction nor induce loyalty. On the other hand, people, after having power, would consider themselves being more important and valuable and would care more about personal benefits (Kipnis, 1972; Rucker, Dubois & Galinsky, 2011; Wu et al., 2014). Gruenfeld, Inesi, Magee & Galinsky (2008) discovered that high-power individuals tended to materialize others and regarded others as the tool to realize personal goals and interests, rather than considering others as individuals with human attributes. Such selfishness has high-power ones attribute the effort, after acquiring the sense of satisfaction or realizing personal goals, to personal devotion, but ignore the contribution of cooperative producers. The selfishness of high-power ones further proves that the effects of interaction-oriented interaction or task-oriented interaction of science & technology management master students being at higher management level (high-power one), through the mediation of satisfaction, on student loyalty are significantly lower than those being at low management level and even non-management position (low-power one). Summing up the above statements, the following hypotheses are proposed in this study.

H3a: The mediation of satisfaction on the effect of interaction-oriented interaction on student loyalty is moderated by science & technology management master students' management level. Students being at higher management level would reveal lower mediation of satisfaction on the relationship between interaction-oriented interaction and student loyalty.

H3b: The mediation of satisfaction on the effect of task-oriented interaction on student loyalty is moderated by science & technology management master students' management level. Students being at higher management level would appear lower mediation of satisfaction on the relationship between interaction-oriented interaction and student loyalty.

Accordingly, the relationship among teachers' interaction styles, student satisfaction, and student loyalty are discussed in this study, and the mediation model of student satisfaction on the relationship between teachers' interaction styles and student loyalty is constructed by referring to past research to analyze the moderation of management level on the mediation of student satisfaction. Meanwhile, it is integrated and revised to become the questionnaire suitable for higher education in China. The research architecture is shown in **Figure 1**.
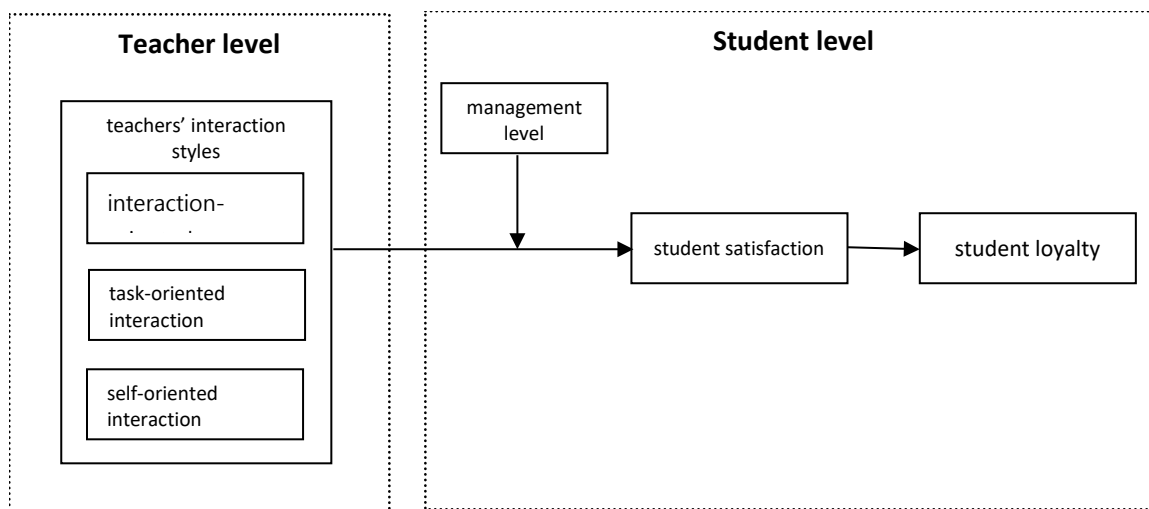
Figure 1. Research architecture

Table 1. Sample characteristics (N=359)

	N	Percentage
Teaching location		
Lanzhou City	69	19.22%
Guangzhou City	85	23.68%
Shenzhen City	178	49.58%
Shanghai City	27	07.52%
Management level		
senior managers	91	25.35%
middle managers	173	48.19%
first-line managers	95	26.46%
Student age	36.2	
Gender		
Male	219	61.00%
Female	140	39.00%

RESEARCH METHOD

Sample Description

With questionnaire survey, science & technology management master students in China are sampled for 541 copies of questionnaire. After deleting invalid ones, total 359 valid copies are received, with the effective retrieval rate 66.4%. The analysis of valid samples is shown in **Table 1**. The major composition contains 219 males and 140 females, with the average age 36.2. The teaching locations distribute in Lanzhou (69 respondents), Guangzhou (85 respondents), Shenzhen (178 respondents), and Shanghai (27 respondents). The surveyed science & technology management master students concentrate on the academic years in 2013, 2014, and 2015. Regarding the management level, 95 respondents are first-line managers, 173 respondents are middle managers, and 91 respondents are senior managers.

Table 2. Mean, standard deviation, and correlation coefficient matrix (N=359)

Variable	Mean	Std	1	2	3	4	5
1. interaction-oriented interaction	3.99	0.66	1				
2. task-oriented interaction	4.20	0.62	0.75**	1			
3. self-oriented interaction	2.08	0.69	-0.36**	-0.45**	1		
4. student satisfaction	4.14	0.66	0.55**	0.59**	-0.39**	1	
5. student loyalty	4.25	0.61	0.43**	0.48**	-0.32**	0.67**	1
CR			0.83	0.83	0.79	0.85	0.87
AVE			0.57	0.58	0.50	0.67	0.63

Note: *p<.05; **p<.01; ***p<.001

Definition and Measurement of Variable

All observed variables in this study are based on previous theories and referring to the opinions of management education experts who adjust and modify some statements and wording of questions. The revised questions are further tested on 30 science & technology management master students. All scales are measured with Likert-5 point scale, where 1 stands for completely disagree and 5 stands for completely agree. The measurement of teachers' interaction styles is referred to the scale developed by Williams & Spiro (1985), including three dimensions of interaction-oriented interaction, task-oriented interaction, and self-oriented interaction. The measurement of student satisfaction is referred to the service satisfaction scale developed by Cronin et al. (2000). The measurement of student loyalty is referred to the student loyalty scale designed by Hennig-Thurau, Langer & Hansen (2001). The **Cronbach's α** of all questions is higher than 0.7, which is higher than the acceptable 0.5 proposed in literatures (Anderson & Gerbing, 1988). Gender, age, school location, and enrolment date are regarded as control variables which might affect student satisfaction and student loyalty to further confuse the causal relationship among major variables.

Statistical Analysis

Applying Hierarchical Linear Regression Analysis to this study, AMOS21.0 and SSPS19 are used for testing the hypotheses. Hierarchical Regression is utilized as it allows moderators being orderly input and other variables being controlled to avoid multicollinearity. Besides, Hierarchical Regression is one of effective tools to analyze moderators.

EMPIRICAL ANALYSIS

Descriptive Statistics Analysis

The mean, standard deviation, and correlation coefficient between interaction-oriented interaction, task-oriented interaction, self-oriented interaction in teachers' interaction styles and student satisfaction, student loyalty in this study are shown in **Table 2**. Interaction-oriented interaction and task-oriented interaction present remarkably positive correlations with student satisfaction and student loyalty, while self-oriented interaction shows notably negative correlations with student satisfaction and student loyalty.

Common Method Bias Analysis

All variables are self-evaluated in the questionnaire by respondents that the conclusion might be affected by common method bias. AMOS21.0 is utilized in this study for testing common method bias with latent error variable control. Common method bias is regarded as a latent variable put into Structural Equation Model for all questions loading on the latent variable. The goodness-of-fit of two models before and after common method bias is compared to judge the existence of common method bias (Anderson & Williams, 1992). The test results reveal that the controlled model (χ2=400.691, df=128, χ2/df=3.130, IFI=0.928, CFI=0.928, RMSEA=0.077) shows better fit than the model before the control (χ2=469.309, df=146, χ2/df=3.214, IFI=0.915, CFI=0.914, RMSEA=0.079), and the

Table 3. Hierarchical Regression Analysis result (N=359)

variable	student loyalty						student satisfaction			
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**	**Model 10**
gender	-0.013	-0.042	-0.037	-0.010	-0.036	-0.011	-0.019	-0.055	-0.047	-0.044
school location	0.115*	-0.014	-0.006	-0.001	-0.026	-0.009	0.146**	-0.010	0.006	-0.018
enrolment date	-0.021	-0.022	-0.030	-0.018	0.005	-0.009	-0.004	-0.012	-0.026	0.022
age	0.072	0.023	0.034	-0.032	-0.006	-0.041	0.129*	0.075	0.101*	0.053
interaction-oriented interaction		0.144*	0.398**	0.083 (p=0.083)				0.236**	0.515**	
task-oriented interaction		0.322**			0.454**	0.131*		0.339**		0.557**
self-oriented interaction		-0.120*						-0.147**		
student satisfaction				0.618**		0.591**				
management level			0.136**	0.073 (p=0.094)	0.104*	0.063			0.102*	0.065
management level×satisfaction				0.005		0.013				
management level × interaction-oriented interaction			-0.122*						-0.122**	
management level × task-oriented interaction					-0.067					-0.080 (p=0.069)
management level × self-oriented interaction										
R²	0.025	0.257	0.221	0.462	0.249	0.461	0.051	0.401	0.343	0.368
Δ R²	0.025 (p=0.065)	0.233**	0.196**	0.437**	0.224**	0.436**	0.051**	0.350**	0.292**	0.316**
Δ F	2.232 (p=0.065)	36.633**	29.408**	71.124**	34.868**	70.723**	4.793**	68.328**	52.032**	58.506**

Note: **p<0.01, *p<0.05, all coefficients are standardized coefficients.

chi square value appears significant changes ($\Delta df=18$, $\Delta\chi2=68.618$). However, the chi square value change is still affected by sample size that other goodness-of-fit indicators should be used for testing common method bias. Apparently, the changes of IFI, CFI, and RMSEA of the controlled model are not as significant as those of the model before control (<0.02). In this case, no serious common method bias exists in this study that the research conclusion is reliable.

Hypothesis Test Analysis

To clearly analyze the effect of teachers' interaction styles on student satisfaction and student loyalty, Hierarchical Regression Analysis is used for the empirical analysis. First, merely students' gender, school location, enrolment date, and age are tested in Model 1; the overall regression model is not remarkable (*F*=2.23, *p*>0.07). Based on Model 1, in which three interaction styles are introduced, R² and F in Model 2 appear notable changes. Besides, interaction-oriented interaction shows significantly positive correlations with student loyalty (β=0.144, p<0.05), task-oriented interaction reveals remarkably positive correlations with student loyalty (β=0.322, p<0.01), and self-oriented interaction appears notably negative correlations with student loyalty (β=-0.120, p<0.05). H2a, 2b, 2c are consequently verified. Second, based on Model 7, in which three interaction styles are introduced, R² and F in Model 8 reveal significant changes. Interaction-oriented interaction presents remarkably positive correlations with student satisfaction (β=0.236, p<0.01); task-oriented interaction shows notably positive correlations with student satisfaction (β=0.339, p<0.01); and, self-oriented interaction reveals significantly negative correlations with student satisfaction (β=-0.147, p<0.01). H1a, 1b, 1c are therefore verified. The test results are shown in **Table 3**.

Mediation of Student Satisfaction

According to the mediation test program proposed by Zhao et al. (2010) and Bootstrap proposed by Preacher & Hayes (2004), the mediation of student satisfaction is tested in this study. The principles contain that (1) the original samples are proceeded random replicated sampling for extracting n samples (n is the sample size), (2)

Table 4. Bootstrap mediation test result (N=359, bootstrap samples=5000)

Path	Indirect effect	95% CI	Direct effect	95% CI
Interaction-oriented interaction affects student loyalty through student satisfaction	0.305*	(0.227, 0.393)	0.078	(-0.008, 0.163)
Task-oriented interaction affects student loyalty through student satisfaction	0.337*	(0.265, 0.421)	0.132**	(0.037, 0.227)
Self-oriented interaction affects student loyalty through student satisfaction	-0.209*	(-0.293, -0.134)	-0.056	(-0.131, 0.019)

Note: **$p < 0.01$, *$p < 0.05$

the mediation estimate is calculated according to the extracted n samples, (3) above steps are repeated for several times (generally 5000 times), and the mediation estimate mean is regarded as the point estimate; all estimates are sequenced to set the mediation confidence interval (Hayes, 2013; Preacher & Hayes, 2004).

The nonparametric percentile Bootstrap of bias correction is proceeded 5000 times to test the mediation of student satisfaction, Table 4. Accordingly, student satisfaction shows remarkable mediation on the relationship between interaction-oriented interaction and student loyalty (Indirect effect=0.305, $p < 0.05$). After controlling student satisfaction, interaction-oriented interaction does not appear notably direct effects on student loyalty (Direct effect=0.078, p=0.075). According to the mediation test program proposed by Zhao et al. (2010) (hereinafter referred to as the test program), student satisfaction completely mediates the relationship between interaction-oriented interaction and student loyalty that H2d is verified. Second, student satisfaction reveals notable mediation on the relationship between task-oriented interaction and student loyalty (indirect effect=0.337, $p < 0.05$). After controlling student satisfaction, task-oriented interaction presents significantly direct effect on student loyalty (direct effect=0.132, $p < 0.01$). According to the test program, student satisfaction partially mediates the relationship between task-oriented interaction and student loyalty that H2e is verified. Finally, student satisfaction shows notable mediation on the relationship between self-oriented interaction and student loyalty (indirect effect=-0.209, $p < 0.05$). After controlling student satisfaction, self-oriented interaction does not appear notably direct effect on student loyalty (direct effect=-0.056, p=0.143). According to the test program, student satisfaction completely mediates the relationship between self-oriented interaction and student loyalty that H2f is verified.

Moderation of Students' Management Level

The sequential test of coefficient product is first applied to test the moderation of science & technology management master students' management level. With Hierarchical Regression Analysis, Table 3, interaction-oriented interaction presents remarkably direct effects on student loyalty in Model 3 (c_1=0.398**), and the interaction between management level and interaction-oriented interaction shows notable effects on student loyalty (c_3=-0.122*). In Model 9, interaction-oriented interaction reveals significant effects on satisfaction (a_1=0.515**), and the interaction between interaction-oriented interaction and management level appears significant effects on satisfaction (a_3=-0.122**). In Model 4, satisfaction presents remarkable effects on student loyalty (b_1=0.618**), and the interaction between management level and satisfaction does not show notable effects on student loyalty (b_2=0.005). Consequently, "a_3b_1=0" is refused and "$a_3b_1 < 0$", showing the negative moderation of science & technology management master students' management level on the mediation of satisfaction on the relationship between interaction-oriented interaction and student loyalty that H3a is verified. Model 5 reveals the notably direct effect of task-oriented interaction on student loyalty (c_1=0.454**), and the interaction between management level and task-oriented interaction does not appear significant effects on student loyalty (c_3=-0.067). Model 10 shows remarkable effects of task-oriented interaction on satisfaction (a_1=0.557**), and the interaction between task-oriented interaction and management level presents notable effects on satisfaction under the level of 0.10 (a_3=-0.080, p=0.069). Model 6 displays the significant effects of satisfaction on student loyalty (b_1=0.591**), and the

interaction between management level and satisfaction does not show remarkable effects on student loyalty (b2=0.013). As a result, under the significance level 0.10, "a3b1=0" is refused and "a3b1＜0", revealing the negative moderation of science & technology management master students' management level on the mediation of satisfaction on the relationship between task-oriented interaction and student loyalty that H3b is verified.

CONCLUSION AND SUGGESTION

Research Conclusion

The research model of the effect of teachers' interaction styles on student satisfaction and student loyalty in higher education is constructed in this study to further clarify the relationship between teachers' interaction styles and student satisfaction, student loyalty, discuss the moderation of management level, and make up the gap of management level and empirical research. Taking science & technology management master students in China as the research object, the empirical results are concluded as below. First, the three interaction styles show obvious prediction on student loyalty, interaction-oriented interaction and task-oriented interaction reveal positive effects on student loyalty, and self-oriented interaction appears negative effects on student loyalty. Second, student satisfaction presents mediation on the relationship between teachers' interaction styles and student loyalty. Third, the mediation of satisfaction on the relationship between interaction-oriented interaction and student loyalty is moderated by science & technology management master students' management level. That is, the higher students' management level, the lower mediation of satisfaction on the relationship between interaction-oriented interaction and student loyalty. The mediation of satisfaction on the relationship between task-oriented interaction and student loyalty is moderated by science & technology management master students' management level. In other words, the higher students' management level, the lower mediation of satisfaction on the relationship between task-oriented interaction and student loyalty.

Academic Contribution

This study enriches the research on the effect of student loyalty. From the aspect of service providers, there has not been a study, from the perspective of student perception, on the direct and indirect effects of teaching service staff's interaction styles on student loyalty. This study also clarifies the relationship among teachers' interaction styles, satisfaction, and student loyalty, enriches the theoretical framework of research on student loyalty, and provides reference for successive research.

In spite that the interaction styles proposed by Sheth (1976) are approved in academia, the empirical research on the idea is little in developing countries. The empirical tests on the causal relationship among variables under various service fields in China are short. Moreover, it also lacks empirical evidence about the mediation of customer satisfaction, as the essential condition of customer loyalty, on the relationship between interaction styles and customer loyalty. Based on the educational service situations in science & technology management graduate schools in China, the master students are selected as the research samples to prove the causal relationship between teachers' interaction styles and student loyalty as well as the mediation of satisfaction. What is more, the occupational background of science & technology management master students is taken into account in this study, and the moderation of science & technology management master students' management level on the mediation of satisfaction on the relationship between task-oriented interaction and student loyalty is also verified. The research conclusion enriches the theoretical research on perceived interaction and interaction styles.

Management Implication

This study presents the following inspirations to higher education service institutions.

1. Differentiation function of servers' interaction styles on student loyalty should be thoroughly understood. The service atmosphere with interaction-oriented interaction and task-oriented interaction should be created. The specific measures contain (1) reinforcing the experiencing design in teaching service to thoroughly develop students' subjective initiative and create interesting interactive

teaching atmosphere, (2) establishing the teaching quality evaluation system, which has students be the evaluation subject and include the evaluation of perceived interaction, to evaluate teachers' work performance, and (3) constantly reinforcing teachers' cognition of "teaching role" and strengthening the ideological education of teachers who present perfunctory attitudes towards teaching tasks.

2. Managers should emphasize the mediation of satisfaction on the transformation of teachers' interaction styles towards student loyalty. It is discovered in this study that teachers' interaction styles would affect student loyalty mainly because they enhance or reduce student satisfaction. Satisfaction depends on students' expectation and the actual perceived service. For this reason, each student's service requirements should be emphasized to effectively evaluate students' service satisfaction. A healthy service feedback mechanism to encourage students thoroughly expressing the service appeals is necessary, and student satisfaction with personalized needs is regarded as the quality standard of service work.

3. Research reveals that power could start individual behaviors approaching the system to enhance individual cognition flexibility and strengthen individual target-oriented behaviors. That is, power could enhance the behavioral performance on the correspondent and consistent goals (Keltner, Gruenfeld & Anderson, 2003; Guinote, 2007). As a consequence, pro-social behavior could be enhanced by promoting high-power individuals' pro-society oriented objectives. For science & technology management master students, the management level is the degree of power which would weaken the interaction and the effect of task-oriented interaction on student loyalty. However, a business school could imbue the common growth of the school and students by reinforcing the gratefulness education to guide students (particularly science & technology management master students with high power background) establishing pro-society oriented objectives with the school to further promote the loyalty to higher education service institutions.

ACKNOWLEDGE

REFERENCES

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*(3), 411-423.

Anderson, S. E., & Williams, L. J. (1992). Assumption about unmeasured variables with studies of reciprocal relationships: The case of employee attitudes. *Journal of Applied Psychology, 77*(5), 638-650.

Chen, Y. C. (2016). The drive behind international student loyalty in higher-educational institutions: a structural equation model. *The Asia-Pacific Education Researcher, 25*(2), 315-323.

Cronin, J. J., Brady, M. K., & Hult. G. T. M. (2000). Assessing the effects of quality, value, and customer satisfaction on consumer behavioral intentions in service environments. *Journal of Retailing, 76*(2), 193-218.

Fornell, C., Johnson, M. D., Anderson, E. W., Cha, J., & Bryant, B. E. (1996). The American Customer Satisfaction Index: nature, purpose, and findings. *Journal of Marketing*, *60*(4), 7–18.

Galinsky, A. D., Magee, J. C., Inesi, M. E., & Gruenfeld. D. H. (2006). Power and perspectives not taken. *Psychological Science, 17*(12), 1068-1074.

Gruenfeld, D.H., Inesi, M.E., Magee, J.C & Galinsky, & A. D. (2008). Power and the objectification of social targets. *Journal of Personality & Social Psychology, 95*(1), 111-27.

Guinote, A. (2007). Behaviour variability and the situated focus theory of power. *European Review of Social Psychology, 18*(1), 256-295.

Guinote, A. (2007). Power affects basic cognition: Increased attentional inhibition and flexibility. *Journal of Experimental Social Psychology, 43*(5), 685-697.

Guinote, A. (2007). Power and goal pursuit. *Personality & Social Psychology Bulletin,* 33(8), 1076-87.

Hayes, A. F. (2013). *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*. New York, NY: The Guilford Press.

Helgesen, Ø., & Nesset, E. (2007). Images, satisfaction and antecedents: drivers of student loyalty? A case study of a Norwegian university college. *Corporate Reputation Review, 10*(1), 38 –59.

Hennig-Thurau, T., M. F. Langer., & Hansen, U. (2001). Modeling and managing student loyalty: An approach based on the concept of relationship quality. *Journal of Service Research*, *3*(4), 331-333.

Huang, S. Z., Wu, T. J., & Tsai, H. T. (2016). Hysteresis Effects of R&D Expenditures and Patents on Firm Performance: An empirical study of Hsinchu Science Park in Taiwan. *Filomat, 30*(15), 4265–4278.

Jacoby, J., & Chestnut, R. (1978). Brand loyalty measurement and management. *Journal of Marketing Research*, *15*(15).

Keltner, D., Gruenfeld, D. H., & Anderson, C. (2003). Power, approach, and inhibition. *Psychological Review, 110*(2), 265-84.

Kipnis, D. (1972). Does power corrupt? *Journal of Personality & Social Psychology, 24*(1), 33-41.

Lammers, J., Galinsky, Gordijn, E. H., & Otten, S. (2012). Power increases social distance. *Social Psychological & Personality Science, 3*(3), 282-290.

Magee, J. C., & Smith, P. K. (2013). The social distance theory of power. *Personality and Social Psychology Review, 17*(2), 158–186.

Oliver, R. L. (1997). *Satisfaction: A Behavioral Perspective on The Consumer*. New York: McGraw-Hill.

Oliver, R. L. (1999). Whence consumer loyalty? *Journal of Marketing, 34*(63), 33-44.

Petrick, J. R., & Backman, S. J. (2001). An examination of golf travelers' satisfaction, perceived value, loyalty, and intentions to revisit. *Tourism Analysis, 6*(3), 223–237.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments & Computers, 36*(4), 717-731.

Rucker, D. D., Dubois, D., & Galinsky, A. D. (2011). Generous paupers and stingy princes: Power drives consumer spending on self-versus others. *Journal of Consumer Research, 37*(6), 1015-1029.

Sheth, J. N. (2012). Buyer-seller interaction: A conceptual framework. *Advances in Consumer Research,* 3.

Shostack, G. L. (1985). *Planning the Service Encounter, The Service Encounter*, New York: Lexington Books, 243-254.

Thomas, S. (2011). What drives student loyalty in universities: An empirical model from India. *International Business Research, 4*(2), 183-187.

Tjosvold, D., & Sagaria, S. D. (1978). Effects of relative power on cognitive perspective-taking. *Personality & Social Psychology Bulletin, 4*(2), 256-259.

Williams, K. C., & Spiro, R. L. (1985). Communication style in the salesperson-customer dyad. *Journal of Marketing Research, 22*(4), 434-442.

Wu, T. J., Tsai, H. T., & Yeh, S. P. (2014). The role of manager's locus of control between perceived guanxi and leadership behavior in family business. *Revista Internacional de Sociologia*, *72*(EXTRA2): 87-104.

Wu, T. J., Tsai, H. T., & Tai, Y. N. (2016). Would corporate social responsibility affect consumers' attitudes towards brand and purchase behavior? Buyer-seller guanxi as the moderator. *Revista de Cercetare si Interventie Sociala*, *53*: 272-287.

Wu, T. J., & Tai, Y. N. (2016). Effects of multimedia information technology integrated multi-sensory instruction on students' learning motivation and outcome. *EURASIA Journal of Mathematics, Science and Technology Education*, *12*(4): 1065-1074.

Zhao, X., Lynch, J. G., & Chen. Q. (2010). Reconsidering baron and kenny: Myth and truth about mediation. *Journal of Consumer Research, 37*(2), 197-206

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