

RESEARCH ARTICLE

The impact of organizational incentives on the loyalty of studying abroad teachers in Hainan, China: The mediating role of organizational commitment

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ABSTRACT

Competition in higher education is essentially a competition for talent, particularly manifested in the competition among high-level university teachers. Therefore, enhancing teachers' loyalty to their profession and universities, controlling talent turnover, and establishing a responsible and well-structured teaching staff are fundamental to the sustainable development of universities. This study, based on the motivation-hygiene theory, utilized convenience sampling to conduct a questionnaire survey on internationally studying teachers from 21 universities in Hainan Province, China. A total of 667 valid questionnaires were collected, and a structural equation model was employed to investigate the influence of organizational incentives in Hainan's universities on the loyalty of international teaching staff; as well as the mediating effect of organizational commitment of international teachers between organizational incentives and loyalty. The research results show that both organizational incentives and organizational commitment can positively predict teachers' loyalty, and organizational incentives can positively predict organizational commitment. Organizational commitment plays a partial mediating role between organizational incentives and teachers' loyalty. Based on this, this study suggests that university administrators should establish a reasonable incentive mechanism and cultivate the organizational commitment of overseas-study teachers, in order to comprehensively enhance the loyalty of overseas-study teachers and ensure the stability of the teaching staff.

Keywords: organizational incentives; loyalty; organizational commitment

1. Introduction

University teachers play the key role and core driving force in promoting the internationalization of higher education^[1]. Therefore, achieving the three major functions of modern universities relies solely on university teachers to cultivate talents through teaching, develop knowledge through research, and apply the knowledge and skills nurtured through talent development and creation to serve economic and social development^[2]. Competition in higher education mainly manifests as competition among high-level university teachers. Therefore, enhancing teachers' loyalty to their profession and the universities, controlling talent turnover, and establishing a high-quality teaching team with strong political integrity, career dedication,

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and sense of responsibility, as well as a well-structured and relatively stable composition, are fundamental for the sustainable development of universities^[3]. Zhao^[4] points out the weaknesses in the faculty of higher education in Hainan, insufficient support for talent development, and slow progress in the internationalization of higher education. It encourages a combination of studying abroad and attracting talent back to the country to further improve the structure of studying abroad, enhancing the global perspectives of outstanding talents. Therefore, this study focuses on teachers studying abroad at universities in Hainan Province, exploring the factors influencing their loyalty in order to help improve the loyalty of teachers studying abroad at universities in Hainan Province.

To a certain extent, the loyalty of teachers is an emotional connection established through certain conditions between schools and teachers. Therefore, a relationship that requires the joint efforts of both schools and teachers is more reliable^[5]. Gao^[6] believed that rewards should not only be material, but also reflected in spirit. Various forms of incentive methods should be set up according to the needs of different teachers to improve their loyalty to the school. Wang^[7] believed that the current loyalty of university teachers was generally low and that their loyalty could be improved by enhancing teacher ethics and campus culture, improving incentive mechanisms, and establishing a good psychological contract. Qiu and Hu^[8] found that incentives have a significant correlation with loyalty. Yang^[5] proposed establishing a more effective incentive system to enhance the loyalty of university teachers.

Teacher organizational commitment is the psychological bond that connects teachers with schools, and it is closely related to teachers' attitudes, job performance, and turnover intentions, it can predict individual withdrawal behaviors such as absenteeism and resignation with stability^[9-12]. Research has found that organizational commitment is a good predictor of turnover rate, with higher levels of organizational commitment among employees being associated with lower turnover rates, and lower turnover rates being correlated with higher loyalty levels^[12-15]. Teacher loyalty refers to the degree of teacher loyalty to the school and department, which is the ultimate reflection of teacher organizational commitment^[16]. Therefore, this study will explore whether teacher organizational commitment affects teacher loyalty.

The root of human behavioral choices lies in intrinsic motivation and needs^[17], and the internal logic of college teachers' loyalty deeply resonates with the Two-Factor Theory^[18]. Therefore, the loyalty of university teachers can be analyzed by considering hygiene factors and motivational factors. Based on the Two-Factor Theory, in actual university settings, it is necessary to fully utilize hygiene factors and stimulate teachers' enthusiasm through motivational factors^[5]. Starting from the "motivational factors" that stimulate teachers' enthusiasm, flexible welfare plans should be established to enhance job satisfaction, strengthen teachers' sense of ownership, and increase organizational commitment. Teacher loyalty refers to the degree of loyalty teachers have towards the school and department, which is the ultimate reflection of teachers' organizational commitment^[16]. Therefore, this study, based on Herzberg et al.'s^[19] Two-Factor Theory, aims to explore the impact of organizational incentives in schools and teachers' organizational commitment on the loyalty of university teachers studying abroad.

Given the current requirements imposed by the Chinese education authorities to comprehensively promote education as a top priority and strengthen the development of the teaching workforce, high standards and high levels are expected in higher education^[20]. With a large number of teachers from universities being sent abroad for further studies, the question arises as to these teachers will continue to stay in their original university upon their return to China. Therefore, researching the loyalty of teachers who study abroad holds certain significance. This study selects overseas teaching staff from universities as the research subjects. The research on the impact pathway of organizational incentives on the loyalty of overseas teaching staff is innovative and provides a favorable basis for improving the loyalty of overseas teaching

staff in universities. At the same time, this study starts from the perspective of the organization (university), with organizational commitment as the mediating variable and collectivism as the moderating variable. It thoroughly analyzes the roles of organizational commitment and collectivism in the impact path of organizational incentives on loyalty, and conducts empirical verification. Based on this, the purpose of this study is: first, to explore the impact of organizational incentives in universities on the loyalty of teachers studying abroad within the local factor context in China; second, to explore the mediating effect of organizational commitment on the loyalty of teachers through organizational incentives in the Chinese context, enriching empirical research on the dual-factor theory in the Chinese context, and providing strategic references for promoting loyalty of university teachers.

2. Literature review and research hypotheses

2.1. Motivation-hygiene theory

Herzberg et al.'s^[19] theory of Motivation Factors and Hygiene Factors, also known as the Two-Factor Theory, established the duality of satisfaction and dissatisfaction as two independent concepts that influence individual behavior. As teachers hold a unique profession where the quality of their work directly affects the quality of education, schools must provide good working conditions, social benefits (Hygiene Factors), and recognition and appreciation (Motivation Factors) to enhance teachers' sense of belonging and achievement, ultimately maximizing their job enthusiasm. Motivating employees with incentives cannot rely solely on material rewards; satisfaction in work and encouragement at a spiritual level may be more effective in igniting their passion for work. Therefore, in practical management, equating Hygiene Factors with external factors and Motivation Factors with internal factors is essential. The Two-Factor Theory, based on knowledge workers like university professors whose professions aligns closely with that of local college teachers, deeply resonates with the internal logic of loyalty among local college teachers. Hence, analyzing the loyalty of university professors using the Hygiene Factors and Motivation Factors from the Two-Factor Theory is appropriate.

The root of human behavior choices lies in intrinsic motivation and needs^[17]. Zhao and Gao^[21] emphasized in the Two-Factor Theory the importance of spiritual motivation and value guidance for individuals. Chen and Chen^[22] pointed out that organizational commitment, as a significant attitude variable for employees, is highly correlated with organizational incentives. This indicates that when organizations adopt incentive measures for employees, it will impact the level of employee commitment to the organization and in turn affect their loyalty. Hygiene factors are mostly related to the work environment, such as salary benefits, company policies, and job security. A lack of hygiene factors can lead to employee dissatisfaction with work. However, once a certain level of is reached, further improvements become challenging to motivate employees. Motivational factors, on the other hand, are more related to the job itself, such as recognition, sense of achievement, and opportunities for advancement. Adequate motivational factors can stimulate employee enthusiasm. Therefore, for schools to operate effectively, they need to enhance hygiene factors to prevent employees from becoming dissatisfied and also focus on motivational factors to inspire employee enthusiasm^[23]. Herzberg et al.'s^[19] Two-Factor Theory established the duality of satisfaction and dissatisfaction. They are not opposites of the same concept but rather two independent concepts that collectively influence individual behavior^[24]. Hence, this study utilizes the Two-Factor Theory as a theoretical basis to investigate the impact of organizational incentives in Hainan universities on the loyalty of foreign teachers. Furthermore, organizational commitment is considered as an intermediary variable between organizational incentives and loyalty for exploration. The study aims to determine if organizational incentives in universities can influence the loyalty of international teachers through

organizational commitment.

2.2. Research on the impact of organizational incentives on loyalty

Ineson and Berechet^[25] mentioned in their research that employee loyalty is influenced by various factors such as salary, benefits, interpersonal relationships, personal incentives, and hierarchical status. Li^[26] proposed that private colleges should always adhere to a people-oriented approach, meet the reasonable needs of teachers, build incentive mechanisms that can motivate teachers, increase training efforts, stabilize high-quality, high-level talents, which will help private colleges maintain good working conditions for teachers, reduce talent turnover, and improve teacher loyalty. Wang^[27] believes that vocational colleges should focus on improving teaching conditions, increasing financial investment, refining incentive mechanisms, and developing excellent campus culture to fully meet the desire of teachers to realize their self-worth and strive to enhance teacher loyalty. According to the research by McKinsey & Company^[28], employee loyalty manifests in different levels, with loyalty at the grassroots being mainly influenced by security factors, while loyalty at higher levels is affected by incentive factors. Therefore, the hypothesis is proposed: H1: The organizational incentives of Hainan universities have a significant positive impact on the loyalty of overseas study-abroad teachers.

2.3. Research on the impact of organizational commitment on loyalty

The organizational commitment of teachers is a psychological link between teachers and schools, closely related to teachers' work attitudes, performance, and retention tendencies, influencing the effectiveness and efficiency of school organizations. Teacher organizational commitment is negatively correlated with employee turnover and other withdrawal behaviors, reliably predicting individual absenteeism and turnover. Meyer and Allen^[14] found that although organizational commitment influences many job performance variables, its impact on turnover is greatest. Emotional commitment, as part of Ling et al.'s^[29] five-factor organizational commitment model, refers to feelings toward the organization. If teachers identify with the school and develop deep feelings, their organizational loyalty is high, and they are willing to contribute to the school and department's development, resisting resignation under any temptation. Studies by Tang and Peng^[30] on the relationship between teacher organizational commitment and turnover intention indicate that emotional commitment and continuance commitment have significant predictive power for turnover intentions, while normative commitment does not predict or has very low predictive power for turnover intentions. Kang and Yang^[31] believe that for university faculty, the higher the university provides them with various resources, the higher their internal attachment to the university will be, thus improving their attitude towards their work and affecting their job performance. Teacher organizational loyalty refers to the degree of loyalty teachers have towards the school and department, representing the ultimate reflection of teacher organizational commitment. Therefore, the hypothesis is proposed: H2: For Hainan university teaching staff studying abroad, organizational commitment has a significant positive impact on loyalty.

2.4. Research on the impact of organizational incentives on organizational commitment

Rosenholtz^[32] and Joffres and Haughey^[33] studies confirmed the significant impact of teacher training opportunities on organizational commitment. Rosenholtz and Simpson^[34] found that organizational commitment of teachers varies at different stages, with novice teachers influenced by school boundary management, mature teachers focused on motivating core teaching tasks, and mid-career teachers valuing autonomy in their work. Xin^[35] emphasized that schools must design incentive mechanisms based on principles of people-oriented, fairness, clear rewards and punishments, and survival of the fittest to reduce the gap between individual and organizational expectations, enhance job satisfaction, and ultimately improve teacher's organizational commitment. Yuan^[36] stated that scientific incentives and constraints mechanisms

(school management system, incentive system) used by university managers can significantly strengthen teachers' organizational commitment. Based on this, the hypothesis is proposed: H3: Organizational incentives in Hainan universities have a significant positive impact on the organizational commitment of internationally studying teachers.

2.5. The mediating role of organizational commitment

The root of human behavioral choices lies in internal motivations and needs^[17]. Zhao et al.^[37] pointed out that the Two-Factor Theory emphasizes the mental incentives and values guiding individuals. Chen and Chen^[22] indicated that organizational commitment, as an important attitude variable, is highly correlated with organizational incentives. Therefore, if an organization provides incentives to employees, it will affect their commitment to the organization and subsequently impact their loyalty. Yin^[38] suggested that focusing on factors such as achievement, responsibility, recognition, growth, challenges, and job responsibilities could enhance teacher satisfaction and motivation, leading to the development of flexible welfare plans, increased job satisfaction, strengthened sense of ownership, and enhanced organizational commitment. Teacher organizational loyalty reflects the degree of loyalty teachers have towards schools and departments^[16]. Furthermore, Li and Zhang^[39] found through research that teacher organizational commitment acts as an intermediate variable between salary fairness and turnover intention. Prior variables affecting organizational loyalty include wages, organizational reliability, leadership style, while variables reflecting consequences include job performance, absenteeism, turnover intention, job burnout, and job alienation^[36, 40-44]. Among these variables, wages, organizational reliability, and leadership style are related to organizational incentives, whereas turnover intention is negatively correlated with loyalty. Therefore, an assumption can be made: H4: Organizational commitment of international teachers in Hainan universities plays an intermediary role in the relationship between organizational incentives and loyalty.

3. Methodology

3.1. Research subjects

According to Wu and Tu^[45], the questionnaire research sample size should be at least 5-10 times the total number of questionnaire items. This study includes 65 questionnaire items, therefore, based on the 10-fold principle, at least 650 teachers should be sampled. Prior to distributing the questionnaire, contact was made with conference organizers and study abroad coordinators at various universities to explain that the survey responses would be anonymous, that teacher's personal information would be kept strictly confidential, and that the research data would only be used for academic purposes. With the teachers' consent obtained, the questionnaire was distributed to teachers at various universities through the Wenjuanxing network. A total of 800 questionnaires were distributed to 21 universities in Hainan Province, China^[46], and 667 valid questionnaires were collected, meeting the minimum sample size requirement with an effective response rate of 83.375%. The background variables in the survey included gender, years of teaching experience, academic title, and institutional nature. Among the responses, there were 338 male teachers (50.7%) and 329 female teachers (49.3%); 229 teachers with 1-5 years of teaching experience (34.3%), 116 teachers with 6-10 years of experience (17.4%), 107 teachers with 11-20 years of experience (16.0%), and 215 teachers with over 21 years of experience (32.2%); 232 assistant professors (34.8%), 211 lecturers (31.6%), 132 associate professors (19.8%), and 92 professors (13.8%); 276 teachers from higher vocational colleges (41.4%) and 391 teachers from undergraduate colleges (58.6%).

3.2. Research tools

3.2.1. Organizational incentives scale

This study used the organizational incentive scale revised by Teng et al.^[47]. The questionnaire consists of six dimensions: financial incentives, appraisal incentives, promotion incentives, innovation incentives, achievement incentives, and social incentives, with a total of 26 items. The scoring method of the scale uses a Likert 5-point scale, ranging from “strongly disagree” to “strongly agree.” The reliability of the scale in this study is as follows: financial incentives .878, appraisal incentives .886, promotion incentives .855, innovation incentives .909, achievement incentives .901, social incentives .889, and the overall scale reliability Cronbach's Alpha coefficient is .947. Results from the confirmatory factor analysis show that the structural validity fit indices are all within an acceptable range (χ^2/df value of 1.233, less than the standard value of 5.00; GFI and AGFI are .962 and .953, respectively, above the threshold of .900; SRMR and RMSEA are .023 and .019, below .080; NFI, RFI, CFI, and IFI values all exceed .900; PNFI and PGFI values exceed .500). The composite reliability (CR) of latent variables are as follows: financial incentives .878, appraisal incentives .886, promotion incentives .855, innovation incentives .909, achievement incentives .901, social incentives .888, all meeting the evaluation standard of above .700^[48]. The average variance extracted (AVE) are: financial incentives .643, appraisal incentives .661, promotion incentives .663, innovation incentives .624, achievement incentives .665, social incentives .666, all meeting the evaluation standard of above .500^[49].

3.2.2. Organizational commitment scale

In this research, referring to Shi^[50], a specialized organizational commitment survey scale was constructed for the group of public physical education teachers in Chinese universities. There are a total of 18 test items divided into three dimensions: affective commitment, continuance commitment, and normative commitment, with 6 measurement items in each dimension. The scoring method of the scale adopts the Likert 5-point scale, ranging from “strongly disagree” to “strongly agree”. The Cronbach's Alpha coefficients for the construct reliability of each dimension in the scale are as follows in this study: affective commitment .911, continuance commitment .917, normative commitment .917, and the overall scale reliability Cronbach's Alpha coefficient is .939. The results of confirmatory factor analysis show that the fit indices are within an acceptable range (χ^2/df value is 1.079, less than the standard value of 5.00, GFI and AGFI are .977 and .970, higher than .900, SRMR and RMSEA are .017 and .011, lower than .080, NFI, RFI, CFI, and IFI values all exceed .900, PNFI and PGFI values exceed .500). The component reliability (CR) of latent variables are affective commitment .911, continuance commitment .917, normative commitment .918, all meeting the evaluation standard of above .700^[48]. The average variance extracted (AVE) for affective commitment, continuance commitment, and normative commitment are .630, .649, and .650 respectively, all meeting the evaluation standard of above .500^[49].

3.2.3. Teacher loyalty scale

This study referenced Porter et al.^[15] in developing an organizational commitment scale to measure employee loyalty. The scale divides loyalty into behavioral loyalty and attitudinal loyalty, consisting of 8 items. The scoring method uses a Likert 5-point scale ranging from “strongly disagree” to “strongly agree.” In this study, the reliability of each facet of the scale is as follows: attitudinal loyalty .907, behavioral loyalty .864, and the overall scale reliability Cronbach's Alpha coefficient is .887. Results of confirmatory factor analysis show that the fit indices are within an acceptable range (χ^2/df value is 1.471, less than the standard 5.00, GFI and AGFI are .989 and .980 respectively, higher than .900, SRMR and RMSEA are .015 and .027 respectively, lower than .080, NFI, RFI, CFI, and IFI values are all above .900, PNFI and PGFI

values exceed .500). The composite reliability (CR) of latent variables is attitudinal loyalty .907, behavioral loyalty .864, all meeting the evaluation standard of above .700^[48]. The average variance extracted (AVE) for attitudinal loyalty is .661, and for behavioral loyalty is .679, both meeting the evaluation standard of above .500^[49].

4. Results

4.1. Common method bias test

In this study, exploratory factor analysis was conducted to perform the Harman's single-factor test, analyzing all questionnaire items through factor analysis. Based on the criteria that KMO should be greater than .800, Bartlett's sphericity test p should be less than .001, the number of factors with eigenvalues greater than 1 should exceed 1, and the maximum factor variance explained should be less than 40%^[51], a common method variance test was carried out. As shown in Table 1, the KMO value was .958, exceeding the reference value of .800, and Bartlett's sphericity test p was less than .001, meeting the significance standard. A total of 12 factors with eigenvalues greater than 1 were extracted, and the variance explained by the first factor was 11.011%, below the reference threshold of 40%. With KMO at .958, exceeding the reference value of .800, and Bartlett's sphericity test showing a significant p value of less than .001, the study concluded that there was no common method bias in the data from the official questionnaire, allowing for continued data analysis.

Table 1. Common method bias test.

Factor	Eigenvalues (≥ 1)	Explained variance	Total variance explained
1	6.716	11.011	11.011
2	4.505	7.385	18.396
3	4.344	7.121	25.517
4	4.251	6.969	32.486
5	4.131	6.772	39.258
6	3.767	6.176	45.434
7	3.635	5.959	51.393
8	2.914	4.777	56.170
9	2.841	4.658	60.827
10	2.801	4.591	65.419
11	2.224	3.646	69.065
12	2.093	3.430	72.496

KMO: .958

Bartlett's sphericity test is significant $p < .001$

Note: The data source is compiled by this study.

4.2. Correlation analysis

This study conducted a correlation analysis of three variables, with the results shown in **Table 2**. The correlation coefficients between the variables ranged from .409 to .462, and all correlations were statistically significant ($p < .001$), indicating a significant positive relationship between organizational incentives, organizational commitment, and teacher loyalty. From **Table 2**, it can be seen that the average value of organizational incentives was ($M=3.501$) with a standard deviation ($SD=0.803$); the average value of organizational commitment was ($M=3.477$) with a standard deviation ($SD=0.853$); and the average value of

teacher loyalty was (M=3.412) with a standard deviation (SD=0.936). When analyzing these scales, the average scores of the items were higher than the mean value of 3, indicating that the ratings of organizational incentives, organizational commitment, and loyalty in Hainan universities were above average, demonstrating a high level. Additionally, the small standard deviations suggest that these variables were relatively densely distributed in the sample, with no apparent differences, showing a high level of consistency and similarity.

Table 2. Correlation analysis of variables.

Variables	M	SD	DL	OI	OC	TL
CI	3.501	0.803	3.501	1		
CC	3.477	0.852	3.477	.436***	1	
TL	3.412	0.936	3.412	.409***	.437***	1

Note 1: OI=Organizational Incentives, OC=Organizational Commitment, TL=Teacher Loyalty, M is the average, SD is the standard deviation

Note 2: ***p<.001

4.3. Structural equation modeling analysis

This study conducted a path analysis of the intermediary model of organizational incentives, organizational commitment, and teacher loyalty in universities in Hainan Province based on research hypotheses. The overall model fit was first tested, following Hair et al.^[48] by considering absolute fit, incremental fit, and parsimonious fit. The evaluation criteria are as follows: the χ^2/df of the intermediary model is 1.042, less than 5.00; GFI is .984, AGFI is .978, both greater than .800; SRMR is .019, RMSEA is .008, both less than .080; NFI is .984, RFI is .978, CFI is .999, and IFI is .999, all greater than .900; PNFI is .733, PGFI is .614, both greater than .500, showing that the intermediary model in this study has good fit.

As shown in Table 3 and Figure 1, the organizational incentives of universities in Hainan Province have a significant positive impact on the loyalty of teachers studying abroad, with a path coefficient of .320 ($p < .001$), indicating that the higher the degree of organizational incentives in Hainan Province's higher education institutions, the higher the loyalty of teachers. Therefore, research hypothesis H1 is supported. The organizational commitment of universities in Hainan Province has a significant positive impact on the loyalty of teachers, with a path coefficient of .453 ($p < .001$), indicating that organizational commitment in universities can positively influence teacher loyalty. Therefore, H2 is also supported. The organizational incentives of universities in Hainan Province have a significant positive impact on organizational commitment, with a path coefficient of .536 ($p < .001$), indicating that the stronger the organizational incentives, the higher the level of organizational commitment. Therefore, H3 is also established.

This study used the Bootstrap Method proposed by Efron^[52] to test the mediation effect. Mackinnon et al.^[53] found that bias-corrected non-parametric percentile Bootstrap method provides the most accurate confidence intervals for the mediation effect. However, to compute confidence intervals, it is recommended to repeat the process at least 1000 times^[54]. This study conducted 2000 iterations of resampling to test the mediation effect. If the 95% confidence interval includes 0, it indicates no mediation effect; if it does not include 0, it suggests the presence of a mediation effect.

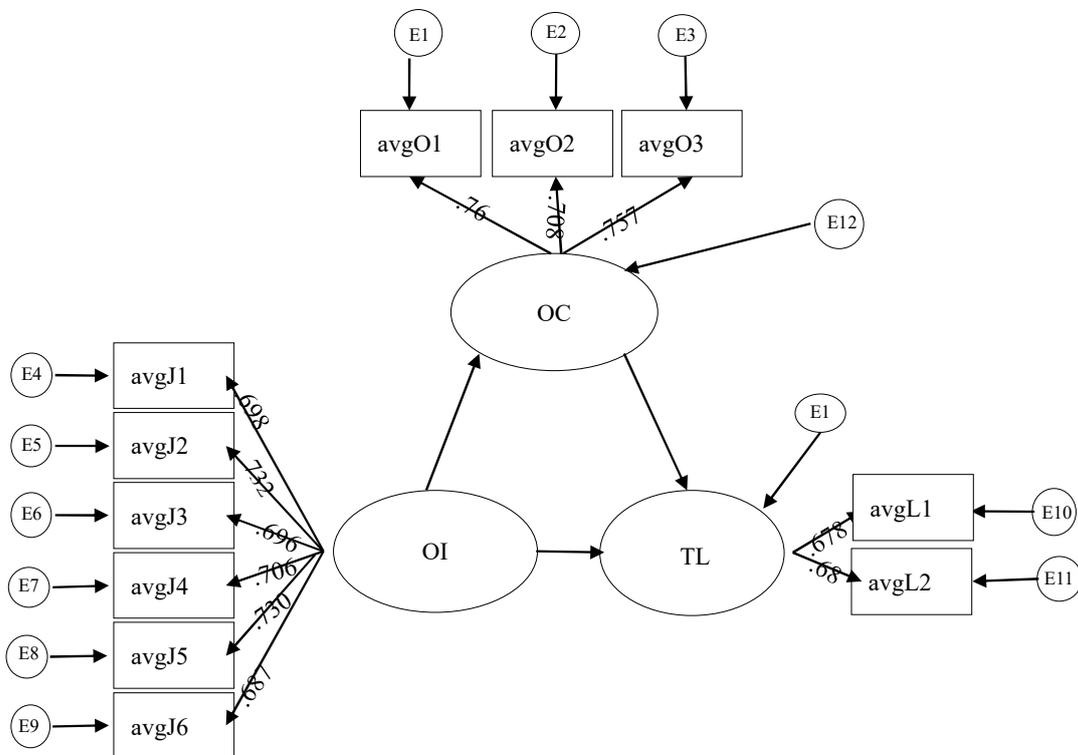
As shown in **Table 4.18**, the indirect effect of organizational incentives on teachers' loyalty is .320, with a 95% confidence interval of [.203, .449], excluding 0, indicating a significant indirect effect, suggesting a mediating effect. This indicates that organizational incentives in Hainan Province's universities can indirectly

influence teachers' loyalty through the mediating effect of organizational commitment, thus supporting hypothesis H4. The total indirect effect of organizational incentives on teachers' loyalty is .472, with a 95% confidence interval of [.472, .658], excluding 0, indicating a significant indirect effect. Specifically, the mediating effect of organizational incentives through organizational commitment on teachers' loyalty is .243, with a 95% confidence interval of [.180, .324], excluding 0, showing a significant indirect effect. Therefore, it can be concluded that organizational commitment in Hainan Province's universities partially mediates the relationship between organizational incentives and teachers' loyalty.

Table 3. Bootstrap mediating effect analysis.

Path	Estimate	P	Confidence Interval (95%)
Direct Effect			
Organizational Incentives→Teacher Loyalty	.320	<.000	.203, .449
Organizational Incentives→Organizational Commitment	.536	<.000	.457, .611
Organizational Commitment→Teacher Loyalty	.453	<.000	.329, .577
Indirect Effect			
Organizational Incentives→Teacher Loyalty	.320	<.000	.203, .449
Organizational Incentives→Organizational Commitment→Teacher Loyalty	.243	<.000	.180, .324
Total Effect			
Organizational Incentives→Teacher Loyalty	.472	<.000	.472, .658

Note: The data source is compiled by this study.



Note 1: OI=Organizational Incentives, OC=Organizational Commitment, TL=Teacher Loyalty

Note 2: The data source is compiled by this study.

Figure 1. Main effects path diagram.

5. Discussion and suggestions

5.1. Discussion

5.1.1. The impact of organizational incentives on teacher loyalty in higher education institutions in Hainan Province, China

Organizational incentives in universities in Hainan province have a significant positive impact on teacher loyalty^[5, 27], indicating that the higher the degree of organizational incentives in universities, the higher the level of the teacher loyalty. This indicates that to enhance the loyalty of university teachers, universities need to effectively motivate teachers both internally and externally to meet their needs. Internal incentive mechanisms focus more on stimulating intrinsic needs and motivations, allowing teachers to experience a sense of achievement and self-worth. This approach addresses the spiritual and cultural needs of university teachers, fostering a positive atmosphere for scientific research and innovation. It encourages teachers to develop an intrinsic desire to innovate, be willing to innovate, and utilize their internal innovative potential to achieve their own value. External incentives, on the other hand, are more based on fulfilling the basic living needs of teachers. The effect of this type of incentive mechanism is relatively short-lived, especially once the material needs of university teachers are essentially met. The continued use of external incentives will see a significant decline in effectiveness and cannot match the stability and durability of internal incentives. University management, especially in relation to teachers, should establish a philosophy of “teacher-oriented” management, viewing teachers as the foundation of the school operation. However, the current professional loyalty of university teachers is generally low, and this can be enhanced by strengthening moral standards and campus culture development, improving incentive mechanisms, and establishing a good psychological contract^[7].

5.1.2. The impact of organizational commitment of teachers in higher education institutions in Hainan Province, China on loyalty

Organizational incentives in higher education in Hainan Province have a significant positive impact on teacher organizational commitment^[9, 31], indicating that the higher the organizational commitment of teachers in universities, the higher their loyalty. In school management, it is important to avoid centralized power or excessive decentralization, enhance communication with teachers and students, and promote teacher initiative through transparency, openness, and democratic decision-making in various matters. This will lead to teachers showing dedication and devotion to their work, ultimately fostering organizational commitment, enhancing their love and loyalty towards their profession^[55]. Due to their upbringing and study abroad experiences, teachers who have studied overseas are often opinionated, eager to express themselves and participate, and value democracy and fairness. Therefore, universities should focus on creating an equal and democratic atmosphere for these teachers, providing opportunities and avenues for them to express themselves, encouraging open communication, and implementing participatory management. On one hand, this approach allows them to feel respected, valued, and trusted by the university, increasing their sense of belonging. On the other hand, it enables the university to gain a deeper understanding of the thoughts and needs of teachers who have studied abroad, providing decision-making references for establishing a "win-win" management model.

5.1.3. The impact of organizational incentives on teacher organizational commitment in higher education institutions in Hainan Province, China

Organizational incentives in universities in Hainan Province have a significant positive impact on teacher organizational commitment^[5, 35], indicating that the higher the level of organizational incentives in universities, the higher the level of teacher organizational commitment. According to Herzberg's two-factor

motivation theory, for teachers, hygiene factors are fundamental, while motivators are essential to fully mobilize their enthusiasm. Motivators include recognition and appreciation for their work, opportunities for personal growth and promotion, a sense of achievement, and responsibility. The needs of university teachers who have studied abroad are not limited to direct material requirements; they also need non-utilitarian and non-economic spiritual incentives. This reflects their independent character. By focusing on factors that are closely related to work, such as achievement, responsibility, recognition, growth and development, challenge, and job duties, which can satisfy teachers and stimulate their enthusiasm for work, flexible benefit plans can be formulated to improve job satisfaction, strengthen teachers' sense of ownership, and enhance organizational commitment^[38]. For both material and spiritual needs, teachers who have studied abroad are similar to regular university teachers. Therefore, a scientifically effective incentive mechanism can help improve the work enthusiasm and loyalty of teachers who have studied abroad.

5.1.4. The mediating role of teacher organizational commitment in higher education institutions in Hainan Province, China

Organizational incentives in universities in Hainan Province indirectly impact teacher loyalty through the mediating effect of organizational commitment^[36, 56, 57], indicating that the direct effect of organizational incentives on teacher loyalty is significant, with organizational commitment playing a partial mediating role. Both intrinsic and extrinsic incentives can effectively enhance organizational commitment levels^[27]. Universities should focus on increasing teachers' affective or normative commitment, reducing continuance commitment, as affective commitment enhances teachers' sense of ownership and voluntary dedication, while normative commitment aligns teachers' behavior with obligations and social norms, leading to better job performance^[58]. As a measure of member loyalty, universities can improve teacher loyalty by enhancing organizational commitment through incentive measures^[59]. If higher education institutions can foster organizational commitment among teachers who have studied abroad, it will help increase their willingness to stay. However, more conservative universities may fail to recognize the necessity of supporting the professional development of these teachers and the importance of the institution's sustainable development, leading to a continued decrease in their loyalty. In summary, teachers who have studied abroad may choose to leave their positions due to the inability to foresee their future development and improvement in living standards. Low levels of organizational commitment drive them to leave their current universities in search of better opportunities.

5.2. Recommendations

5.2.1. Establishing incentive mechanisms to inspire teachers' enthusiasm for work

Establishing rational and effective incentive mechanisms that prioritize the interests of teachers can better stimulate their initiative and loyalty, while also enhancing the teaching quality and competitive advantage of schools. There are two criteria for evaluating the effectiveness of incentive mechanisms: first, whether they can maximally mobilize teachers' enthusiasm and initiative to efficiently complete their work with high quality. Second, whether teachers are relatively satisfied with the incentive mechanism and feel a sense of fairness and satisfaction from it. A university's performance assessment mechanism should be oriented towards teachers' teaching abilities and research achievements, focusing on stimulating teachers' self-consciousness in teaching and research, establishing a reasonable and flexible performance assessment mechanism. Titles alone should not determine talent, nor should qualifications solely represent capability. Depending on the school's actual situation, educational positioning, and strategic development goals, assessments should be based on job responsibilities, evaluating teachers' work performance and contributions. Implementing a system where more work leads to more rewards and excellent performance results in excellent rewards can attract and encourage outstanding teachers to consciously enhance their

teaching abilities and improve research capabilities.

5.2.2. Establishing the central role of teachers in the educational process

Teachers' loyalty to universities is not just a matter of the teachers themselves, but is closely related to the school as well. General Secretary Xi Jinping pointed out in a condolence letter to Chinese teachers: "Teachers are the foundation of education, the source of its development, and bear the heavy responsibility of ensuring the healthy growth of every child and providing satisfactory education for the people." Teachers are the primary resource in education, the decisive factor in the development of university careers, and the agents of education. The pivotal position of teachers is reflected in every aspect, allowing each teacher to fully enjoy various rights such as the right to information, participation, expression, decision-making, and supervision within the school. In school management, strengthening communication with teachers and students, through open, transparent, and democratic decision-making on various affairs, can fully unleashing the enthusiasm of teachers' work, enabling teachers to be dedicated and devoted, wholeheartedly engaging in educational work, and enhancing their love and loyalty to the profession.

5.3. Limitations and prospects

The limitations of this study include: First, due to the influence of material and time constraints, this study serves only as a phase-based static analysis, primarily utilizing cross-sectional data. This approach may not sufficiently establish causal relationships between variables, potentially leading to time lag in the research conclusions. Therefore, future research needs to measure each variable over multiple periods and longitudinally. Longitudinal research is a time-spanning method that tracks changes within the same group over a period, allowing for a more comprehensive understanding of the development processes and patterns of events, phenomena, or situations. Second, this study uses the two-factor theory and introduces organizational commitment to explain the mechanism by which organizational incentives affect teacher loyalty. However, the partial mediating role suggests that there may be other mediating variables between organizational incentives and teacher loyalty. Hence, future research could introduce new mediating variables to further elucidate the intrinsic processes by which organizational incentives influence teacher loyalty.

Author contributions

Cheng Huang made various contributions to this study. Firstly, she proposed the research topic and hypotheses, and constructed the research framework, laying the foundation for the entire study. Secondly, she designed the research methods, including selecting appropriate research subjects, developing effective research tools, and determining the appropriate data analysis methods. During the data collection and collation process, she was responsible for the distribution and recovery of the questionnaires and conducted strict screening and collation of the data to ensure the validity of the data. Through statistical analysis and hypothesis verification, she conducted in-depth analysis and interpretation of the data. In addition, she wrote the initial draft of the article, covering the introduction, literature review, methods, results, and discussion, and made multiple revisions and improvements to the article to ensure its logic and coherence. At the same time, she produced relevant charts and images to display the research results more intuitively. Throughout the research process, she was also responsible for supervising the progress of the research, coordinating all aspects of the work, and ensuring the timely completion of the research. Finally, she may have also been responsible for obtaining the necessary funding support for the research, providing a guarantee for the smooth progress of the research.

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Conflict of interest

The authors declare no conflict of interest.

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