



Influence of practical teaching ability on academic performance: Student satisfaction as A mediator

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Abstract

This paper discusses the relationship between teachers' practical teaching ability and students' academic performance. A total of 3,677 students from 18 vocational schools completed a series of questionnaires, including the Student Satisfaction Scale, the Student Academic Performance Scale and a Perceived Teachers' Practical Teaching Ability Scale. The results show that teachers' practical teaching ability positively correlates with students' academic performance. In addition, student satisfaction plays a mediating role between teacher' practical teaching ability and students' academic performance. The practical implications and research limitations are further discussed.

Keywords: teachers' practical teaching ability, student satisfaction, student academic performance, teaching ability, secondary school

Introduction

Academic performance reflects students' comprehensive learning qualities and abilities, and it is also an essential basis for evaluating teachers' teaching quality (Chen *et al.*, 2018) ^[11]. The factors that influence academic performance are complex. The ecological systems theory (Bronfenbrenner & Morris, 2007) ^[8] states that an individual's behavior is nested within a series of interacting environmental systems. The system is divided into four levels, including microsystem, mesosystem, exosystem and macrosystem. The influence of micro systems is particularly important. In the microsystem, teachers are one of the most important components; Their behaviors, abilities and attitudes will unconsciously affect students' academic performance. Research shows that professional teacher development affects teachers' instructional practice, which subsequently affects student learning and achievement (Fischer *et al.*, 2018) ^[21]. In the field of vocational education, practical teaching ability is an important aspect of teaching. It refers to the ability to integrate theory with practice and transform book knowledge into practical technology and experience (Xie, 2021) ^[56]. Against the background of high-quality development of vocational education, improving practical teaching has become an important basis for students' development and the construction of a skilled society. However, few studies have examined the influence of practical teaching ability on students' academic performance or its internal mechanism. This study intends to further examine the relationship between practical teaching ability and academic performance and explore the mediating effect of students' satisfaction.

Literature Review and Research Hypotheses

Teachers' Practical Teaching Ability and Students' Academic Performance

Social learning theory proposes that individuals' thoughts, abilities and behaviors are affected by their important others (Bandura & Walters, 1977) ^[3]. Teachers, as an integral part of students' environment, play an important role in the learning process by imparting knowledge and skills. A student's academic performance includes not only grades, but also their performance in internship and learning acquisition. Among the various factors affecting students' academic performance, teachers were found to have a substantial effect (Koçak *et al.*, 2021) ^[34]. Such factors include teachers' support (Clark *et al.*, 2020) ^[9], teacher engagement (Borup *et al.*, 2014) ^[4], and teaching methods (Koirala, 2019) ^[36]. Therefore, teachers with strong practical teaching ability provide more support for students. They invest more time and energy in practical teaching and master various teaching methods. Therefore, teachers' practical skills, professional knowledge and operational skills are beneficial to improve students' comprehensive quality and further facilitate students' academic performance. Hence, we proposed the following hypothesis:

Hypothesis 1: Teachers' practical teaching ability will have a significant positive impact on students' academic performance.

The Mediating Effect of Student Satisfaction

The term "student satisfaction" originates from the customer satisfaction theory, which refers to the subjective evaluation of products or services (Kotler & Keller, 2009) ^[35]. It was introduced into pedagogy to measure the

difference between the classroom experience and students' psychological expectations (Suhre *et al.*, 2007) ^[51]. In the student-centered constructivism theory, student satisfaction is an important indicator of teaching quality (Razinkina *et al.*, 2018) ^[49].

Practical teaching ability affects student satisfaction. Previous studies have found that student satisfaction is impacted by effective teaching, teacher quality, and curricula construction (Bobe & Cooper, 2020; Guo, 2016) ^[6, 23]. Research has found that student satisfaction significantly relates with the clinical experiential teaching used by clinical faculty (Sigler *et al.*, 2022) ^[52]. Therefore, the higher the level of practical teaching skills of the teachers, the better their classroom teaching quality, which in turn raises students' satisfaction. Therefore, we proposed the following hypothesis:

Hypothesis 2A: Practical teaching ability will positively correlate with students' satisfaction.

Student satisfaction may affect academic performance. Fredrickson's (2001) ^[17] broaden-and-build theory proposed that positive emotions can strengthen an individual's long-term physical, cognitive, social, and other resources and trigger growth and development. Student satisfaction is a positive emotional experience, and has been shown to positively predict academic performance (Keržič *et al.*, 2021; Mackey, 2019) ^[32, 42]. Research has also shown that student satisfaction plays a mediating role between teaching quality and examination pass rates (Guo, 2016) ^[23], as well as teaching services and student loyalty (Hassan & Shamsudin, 2019) ^[24]. Therefore, the more a student's expectations are exceeded regarding the knowledge, skills and support they obtain during school, the better the student will perform academically. Therefore, we proposed the following hypothesis:

Hypothesis 2B: Student satisfaction will positively correlate with student academic performance.

In summary, student satisfaction is an intrinsic perception of teachers' teaching quality, and academic performance is an extrinsic learning outcome. Practical teaching ability affects students' satisfaction and academic performance through educational activities such as the transmission of knowledge and skills. Therefore, we proposed the following hypothesis:

Hypothesis 3: Student satisfaction will play a mediating role in the relationship between practical teaching ability and academic performance among vocational school students.

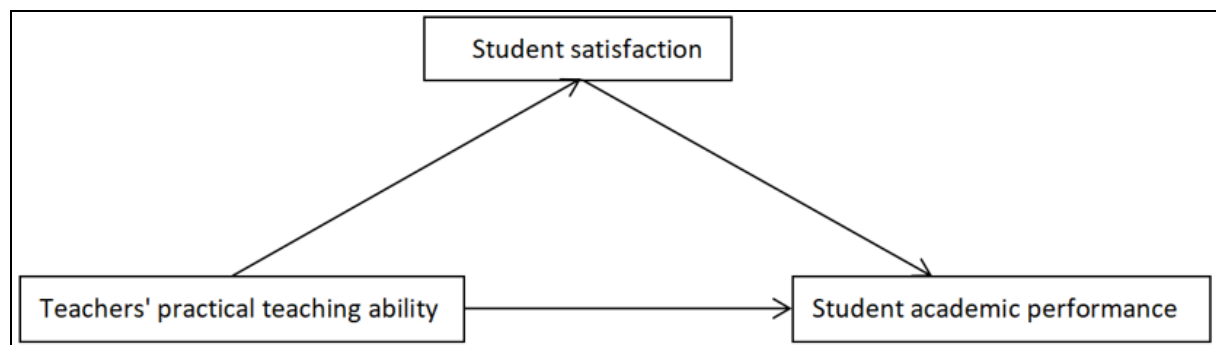


Fig 1: Conceptual Research Model

Method

Participants and Procedure

In this study, questionnaires were handed out at 18 vocational schools in Guangdong and Hubei, to a total of 3677 students, then collected upon completion. After 301 invalid questionnaires were excluded, 3376 valid questionnaires were obtained. The questionnaire recovery rate was 91.8%. Of these, 1671 were boys, and 1424 were girls. Participants by grade ranged from 221 in Grade 7, 2308 in Grade 8, and 742 in Grade 9. The students were aged 15–19 years ($M = 16.6$, $SD = 0.82$).

Measures

According to the description of competency requirements for vocational teachers (De Bruijn & Leeman, 2011) ^[13], we came up with five questions to measure students' perception of their teachers' practical teaching ability. They are as follows:

1. "The teacher often introduces the enterprise production experience into classroom teaching."
2. "The teacher's practical operation skills are very skilled."
3. "The teacher's demonstration is accurate and standardized."
4. "The teacher pays great attention to the cultivation of our independent operation ability."
5. "The teacher pays great attention to the cultivation of our normative consciousness."

Participants answered the questions using a 5-point Likert scale, where 1 = very inconsistent and 5 = very consistent. Cronbach's alpha was 0.93 in this study.

We divided the students' academic performance into three dimensions: academic outcome, learning performance, and learning acquisition. Academic outcome is measured by the item, "What is the level of your academic performance according to last year's evaluation?" using a 5-point Likert scale, where 1–5 represent lower, lower-middle, middle, upper-middle, and upper, respectively. Learning performance is measured by the

items “My performance in the school practice course” and “My performance in the off-campus practice training.” Participants scored each item using a 5-point Likert scale, where 1 = very poor and 5 = very good. Learning acquisition was measured by the item, “I have harvested knowledge in the past year.” Participants measured the amount of knowledge gained using a 5-point Likert scale, where 1–5 denote almost none, little, average, more, and substantial. Cronbach’s alpha was 0.75 in this study.

According to the Student Satisfaction Scale (Elliott *et al.*, 2002) [15], student satisfaction is measured using three questions:

1. “Are you satisfied with the teaching quality of the course?”
2. “Are you satisfied with your current learning experience?”
3. “Are you satisfied with your school learning environment?”

Each question is answered using a 5-point Likert scale, where 1 = very dissatisfied and 5 = very satisfied. The Cronbach’s alpha was 0.71 in this study.

Results

Descriptive Summary of Variables

The mean, standard deviation and correlation coefficient are shown in Table 1. We found that teachers’ practical teaching ability is positively correlated with students’ academic performance and students’ satisfaction. Additionally, we found that students’ satisfaction is positively correlated with students’ academic performance. These findings laid the foundation for further testing the mediating effect of student satisfaction.

Table 1: Means, Standard Deviations, and Correlation Coefficients of Study Variables

Variable	M	SD	1	2	3
1. practical teaching ability	4.19	0.75	1		
2. student satisfaction	3.64	0.76	0.45**	1	
3. student academic performance	3.70	0.71	0.29**	0.33**	1

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

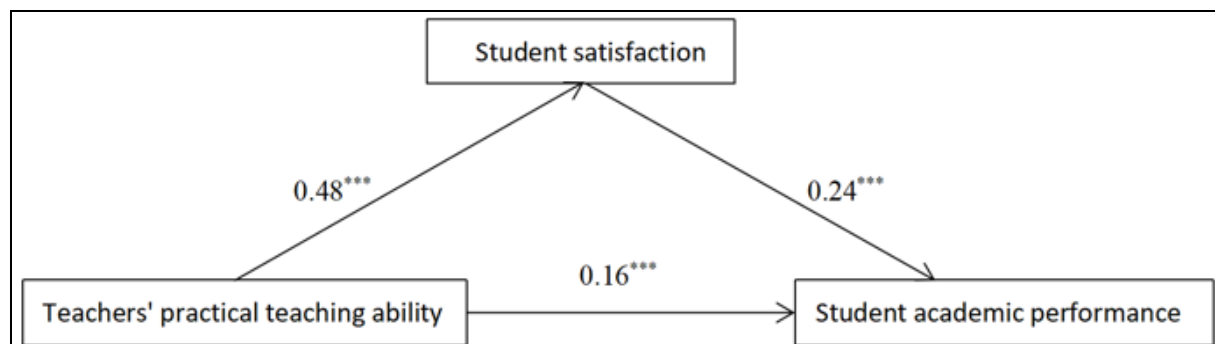
Hypotheses Testing

According to Hayes (2013), model 4 of the SPSS PROCESS macro is used to test the mediating effect of students’ satisfaction on the relationship between teachers’ practical teaching ability and students’ academic performance. The results of this analysis show that teachers’ practical teaching ability significantly affects students’ satisfaction, $\beta = 0.48$, $SE = 0.02$, $p < 0.001$; Teachers’ practical teaching ability significantly affects students’ academic performance, $\beta = 0.16$, $SE = 0.02$, $p < 0.001$; and student satisfaction affects students’ academic performance, $\beta = 0.24$, $SE = 0.02$, $p < 0.001$. We also applied the bias-corrected bootstrapping procedure with 1,000 bootstrapped resamples and a confidence interval (CI) of 95%, to test the significance of the moderated mediation effect. The results showed that student satisfaction had a significant mediating effect between teachers’ practical teaching ability and students’ academic performance. The proportion of mediating effect in the total effect was 42.59%, and the confidence interval of Boot SE = 0.01, 95% CI [0.09, 0.14].

Table 2: Structural Path Model of Hypothesis Testing Outcomes

Hypothesis	Routes	Standardized coefficient	Result
H1	teachers’ practical teaching ability → student academic performance	0.16***	supported
H2a	teachers’ practical teaching ability → student satisfaction	0.48***	supported
H2b	student satisfaction → student academic performance	0.24***	supported

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.



Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Fig 2: Main Results for the Mediation Model

Discussion

This study found that teachers' practical teaching ability significantly impacts students' academic performance. Our findings are consistent with previous studies on the influence of teachers' self-efficacy (Fauth *et al.*, 2019), professional knowledge (Hill & Chin, 2018) ^[30], and behavior (Royer *et al.*, 2019) ^[45] on students' academic performance. Teachers with strong practical teaching ability have mastered more effective teaching methods and instructional strategies. They integrate theory with practice in teaching and grasp the cognitive characteristics and needs of their students. Students' practical skills and problem-solving abilities are cultivated, ultimately leading to improvements in students' academic performance.

The above research conclusion has been supported at multiple levels in existing research. First, practical teaching ability may affect students' learning engagement (Rodriguez & Koubek, 2019) ^[47]. Teachers with strong practical teaching ability arrange and organize teaching content according to students' interests and characteristics. These teachers transform achievement from a set of static teaching goals to the students' dynamic learning process. They more readily grasp students' interests and needs, making students more immersed in their classrooms (Ni, 2019) ^[43]. This improves students' academic engagement, thereby positively affecting their academic performance (Lei *et al.*, 2018) ^[38]. Second, teachers' practical teaching ability also influences students' skill acquisition. Teachers with strong practical teaching ability are familiar with the business standard, operational procedures and product process requirements for vocational training. They make full use of the classroom by giving students independent space (Smirnova *et al.*, 2019) ^[54]. Students move from imitation to proficient application, internalizing practical operational skills into their comprehensive professional competence and facilitating their mastery of technical skills (Mu *et al.*, 2020; Zhang *et al.*, 2022) ^[40, 58].

This study also found that student satisfaction plays a mediating role between practical teaching ability and academic performance. That is, strong practical teaching ability can promote student satisfaction, and improved satisfaction benefits to increase academic performance. This result is consistent with the customer satisfaction theory (Suhre *et al.*, 2007) ^[51] and the broaden-and-build theory (Fredrickson, 2001) ^[17]. The result indicated that teachers with better practical teaching ability are more capable of improving the classroom environment and promoting student satisfaction (Abraham *et al.*, 2020) ^[1]. Students with higher levels of satisfaction are more optimistic and confident regarding challenges in learning, adaptive to their learning environments, and willing to seek peer cooperation, thereby improving their academic performance.

Compared with teachers' practical teaching ability, student satisfaction had a greater impact on students' academic performance, with a mediating effect of student satisfaction accounting for 42.59%. It showed that the external support provided by teachers works through internal mechanisms. Previous studies have also proved that teachers can affect students' psychological capital and learning motivation, which in turn affect academic performance (Hamaideh & Hamdan-Mansour, 2014) ^[26]. These findings indicate that teachers, schools, and relevant departments should evaluate student satisfaction.

Practical implications

Teachers should carefully select course-relevant cases, adopt project-based teaching models, and create realistic job scenarios to improve classroom practicability. They should also adopt diversified teaching methods, and use modern information technology to increase students' enthusiasm for practical classroom participation. Finally, schools and enterprises should cooperatively build practice training platforms, to strengthen students' practice training.

To enhance the attractiveness of vocational education, administrators should use student satisfaction as a development strategy and assessment indicator for teaching quality. Stakeholders should pay attention to the value student satisfaction has in enhancing students' academic performance. Teachers can encourage students to participate in skill competitions, and they should focus on teacher-student interaction and feedback. Especially, teachers should strengthen the connection between practical courses and professional needs and create a good practical teaching environment for students.

Limitations and prospects

First, the self-reporting method identified students' academic performance, which does not necessarily match students' true grades or operation skills. Second, this was a cross-sectional study, which cannot reveal whether there is a stable, causal relationship between teachers' practical teaching ability and students' academic performance, or student satisfaction. Therefore, future researchers should consider the comprehensive use of experimental and observation methods, and objectively measure the ability levels of teachers and students.

References

1. Abraham HN, Opara IN, Dwaihy RL, Acuff C, Brauer B, Nabaty R, *et al.* Engaging third-year medical students on their internal medicine clerkship in telehealth during COVID-19. *Cureus*, 2020, 12(6).
2. [https://doi: 10.7759/cureus.8791](https://doi.org/10.7759/cureus.8791)
3. Bandura A, Walters RH. *Social learning theory* [M]. Prentice Hall: Englewood cliffs, 1977.
4. Borup J, Graham CR, Drysdale JS. The nature of teacher engagement at an online high school. *British Journal of Educational Technology*, 2014;45(5):793-806.
5. <https://doi.org/10.1111/bjet.12089>

6. Bobe BJ, Cooper BJ. Accounting students' perceptions of effective teaching and approaches to learning: Impact on overall student satisfaction. *Accounting & Finance*,2020:60(3):2099-2143.
7. <https://doi.org/10.1111/acfi.12364>
8. Bronfenbrenner U, Morris PA. The bioecological model of human development. *Handbook of child psychology*, 2007, 1.
9. Clark M, Adams D, Roberts J, Westerveld M. How do teachers support their students on the autism spectrum in Australian primary schools? *Journal of Research in Special Educational Needs*,2020:20(1):38-50.
10. <https://doi.org/10.1111/1471-3802.12464>
11. Chen X, Zhang DJ, Cheng G, Hu TQ, Liu GZ. The effects of teacher support and psychological Suzhi on middle school students' academic achievement. *Psychological Development and Education*,2018:34(6):707-714.
12. <https://doi.org/10.16187/j.cnki.issn1001-4918.2018.06.09>
13. De Bruijn E, Leeman Y. Authentic and self-directed learning in vocational education: Challenges to vocational educators. *Teaching and Teacher Education*,2011:27(4):694-702.
14. <https://doi.org/10.1016/j.tate.2010.11.007>
15. Elliott, Kevin M, Shin Dooyoung. Student Satisfaction: An alternative approach to assessing this important concept. *Journal of Higher Education Policy and Management*,2002:24(2):197-209.
16. <https://doi.org/10.1080/1360080022000013518>
17. Fredrickson B L. The role of positive emotions in positive psychology: the broaden-and-build theory of positive emotions [J]. *American psychologist*,2001:56(3):218.
18. <https://doi.org/10.1037/0003-066X.56.3.218>
19. Fauth B, Decristan J, Decker AT, Büttner G, Hardy I, Klieme E, Kunter M. The effects of teacher competence on student outcomes in elementary science education: The mediating role of teaching quality. *Teaching and Teacher Education*,2019:86:102882.
20. <https://doi.org/10.1016/j.tate.2019.102882>
21. Fischer C, Fishman B, Dede C, Eisenkraft A, Frumin K, Foster B, *et al.* Investigating relationships between school context, teacher professional development, teaching practices, and student achievement in response to a nationwide science reform. *Teaching and Teacher Education*,2018:72:107-121.
22. <https://doi.org/10.1016/j.tate.2018.02.011>
23. Guo K. Empirical study on factors of student satisfaction in higher education. *Revista Ibérica De Sistemas e Tecnologias De Informação*,2016:(E11):344.
24. Hassan S, Shamsudin M. Measuring the effect of service quality and corporate image on student satisfaction and loyalty in higher learning institutes of technical and vocational education and training[J]. *International Journal of Engineering and Advanced Technology*,2019:8(5):533-538.
25. <https://doi.org/10.35940/ijeat.E1077.0585C19>
26. Hamaideh SH, Hamdan-Mansour AM. Psychological, cognitive, and personal variables that predict college academic achievement among health sciences students. *Nurse education today*,2014:34(5):703-708.
27. <https://doi.org/10.1016/j.nedt.2013.09.010>
28. Hayes AF. *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. The Guilford Press. New York, 2013.
29. <https://doi.org/10.1111/jedm.12050>
30. Hill HC, Chin M. Connections between teachers' knowledge of students, instruction, and achievement outcomes. *American Educational Research Journal*,2018:55(5):1076-1112.
31. <https://doi.org/10.3102/0002831218769614>
32. Keržič D, Alex JK, Pamela Balbontín Alvarado R, Bezerra DDS, Cheraghi M, Dobrowolska B, *et al.* Academic student satisfaction and perceived performance in the e-learning environment during the COVID-19 pandemic: Evidence across ten countries. *Plos one*,2021:16(10):e0258807.
33. <https://doi.org/10.1371/journal.pone.0258807>
34. Koçak Ö, Göksu İ, Göktaş Y. The Factors Affecting Academic Achievement:A Systematic Review of Meta Analyses. *International Online Journal of Education and Teaching*,2021:8(1):454-484.
35. Kottler P, Keller KL. *Marketing management*. Jakarta: Erlangga., 2009.
36. Koirala KP, Pak B, Seifert L, Brandt S, van Rijdt D, Schacher B, *et al.* Effectiveness of practical work on students' achievement in science at secondary level in Gorkha District Nepal. *Journal of Advances in Education Research*,2019:4(4):139-147.
37. <https://dx.doi.org/10.22606/jaer.2019.44001>
38. Lei H, Cui Y, Zhou W. Relationships between student engagement and academic achievement: A meta-analysis. *Social Behavior and Personality: an international journal*,2018:46(3):517-528.
39. <https://doi.org/10.2224/sbp.7054>
40. Mu F, Ju Q, Gao S, Zhang Y. Strengthen Practical Teaching and Cultivate Students' Ability of Application and Innovation. In *2020 International Conference on Advanced Education, Management and Social Science (AEMSS2020)* (pp. 75-80). Atlantis Press., 2020.
41. <https://doi.org/10.2991/assehr.k.200723.105>

42. Mackey MJ. Examining the Relationship between Medical Student Satisfaction and Academic Performance in a Pre-Clinical, Flipped-Classroom Curriculum., 2019.
43. Ni Y. Research on the Training of Individualized and Diversified Practical Teaching Ability of Basic Art Teachers., 2019.
44. [https://doi: 10.25236/eduer.2019.028](https://doi.org/10.25236/eduer.2019.028)
45. Royer DJ, Lane KL, Dunlap KD, Ennis RP. A systematic review of teacher-delivered behavior-specific praise on K–12 student performance. *Remedial and Special Education*, 2019;40(2):112-128.
46. <https://doi.org/10.1177/0741932517751054>
47. Rodriguez RJ, Koubek E. Unpacking High-Impact Instructional Practices and Student Engagement in a Preservice Teacher Preparation Program. *International Journal for the Scholarship of Teaching and Learning*, 2019;13(3):11.
48. <https://doi.org/10.20429/ijstl.2019.130311>
49. Razinkina E, Pankova L, Trostinskaya I, Pozdeeva E, Evseeva L, Tanova A. Student satisfaction as an element of education quality monitoring in innovative higher education institution. In *E3S Web of Conferences*, 2018;33:03043). EDP Sciences.
50. <https://doi.org/10.1051/e3sconf/20183303043>
51. Suhre CJ, Jansen EP, Harskamp EG. Impact of degree program satisfaction on the persistence of college students. *Higher Education*, 2007;54(2):207-226.
52. Sigler R, Roberts E, Welford E, Keehner J, Wooten D. Evaluation of an Infectious Diseases Elective for Early Clinical Medical Students on Their Internal Medicine Clerkship. In *Open forum infectious diseases*, 2022;9(5):120). US: Oxford University Press.
53. <https://doi.org/10.1093/ofid/ofac120>
54. Smirnova ZV, Vaganova OI, Loshkareva DA, Konyaeva EA, Gladkova MN. Practice-oriented approach implementation in vocational education. In *IOP Conference Series: Materials Science and Engineering*, 2019;483(1):012003. IOP Publishing.
55. [https://doi:10.1088/1757-899X/483/1/012003](https://doi.org/10.1088/1757-899X/483/1/012003)
56. Xie Q. Research on the Practical Teaching Platform of Marketing Course in Local Universities Based on the Cultivation of Innovation and Entrepreneurship Ability. *Frontiers in Educational Research*, 2021, 4(3).
57. [https://doi: 10.25236/FER.2021.040303](https://doi.org/10.25236/FER.2021.040303).
58. Zhang S, Sun X, Yao Z. Exploration of Divergent Experimental Teaching for Improving Students' Innovative Practical Ability. In *2021 International Conference on Culture, Design and Social Development (CDS2021)*, 2022, 186-189. Atlantis Press.
59. <https://doi.org/10.2991/assehr.k.220109.037>