Influence factors of teachers' pro-industry teaching demand adjust Industry 4.0

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Abstract

This study examines 322 vocation teachers' pro-industry teaching demand and its influencing factors to serve as a school reference for adjust industry 4.0. The results show that teachers' industry development has a significant direct effect on vocation teachers' teaching pro-industry demand, and pro-industry self-efficacy has a significant effect on pro-industry teaching demand through industry development. The influence pattern and empirical data of pro-industry self-efficacy and industry development on pro-industry teaching demand has a good fit. This will serve as a reference for vocation schools' encouragement of teacher professional development and industry need.

Keywords: cognitive apprentice; teacher development; pro-industry teaching; industry 4.0

Introduction

It is affected by the aging of the young population in the developed countries. They are faced with the problem of reducing the labor force. In 2011, the United States launched the AMP project and the "CPS program ", Germany in 2012 to promote the" Industrial 4.0 "program to enhance the international manufacturing leadership, Japan in 2013 launched the "Japan Industrial Revitalization Plan" to enhance equipment research and development, South Korea in 2014 proposed" manufacturing innovation 3.0 "Strategy, to help small and medium manufacturing to establish the wisdom and optimization of production, China also issued in 2015 "Made in China 2025" program[1] [2].

Facing the problem of aging, low birthrate and lack of industrial workers, the coming of the industrial age of 4.0 will be an opportunity for Taiwan. The Taiwanese government has promoted the "Productivity 4.0" and intellectualized policies of Taiwan's manufacturing industry. It is important that Taiwan's industrial development and put forward its unique value proposition to keep the country and the industry competitive in the global competition[3] [4]. Therefore, teachers' pro-industry teaching need to understand the results of teaching strategies, teachers need to enhance the interpretation and demand connotation of industrial transformation in the process of industrial transformation[5] [6]. It is important that depending on teachers' self-reflection, professional knowledge and rich teaching experience to construct [7] [8].

The above research questions and their results are all based on the vocational training center of the teachers in the industry 4.0, as a follow-up as soon as possible to adjust the occupation class pre-service teachers It is also an urgent motive to study the content of the teaching specialized course in the teaching industry, and to establish the cognitive mechanism of the

professional education of the pre-occupation teachers. The purposes of this study are to address the 2 following issues.

- 1. There is no significant correlation between tertiary teachers' pro-industry self-efficacy, industry development and pro-industry teaching demand.
- 2. Influence models of tertiary teachers pro-industry self-efficacy, industry development, and pro-industry teaching demand fit the data collected by this study.

Methodology

Subjects

This study treats 338 teachers from vocation schools as the population, and adopts random sampling and cluster sampling for survey.

Measure

The research tool is a "Questionnaire of Influence Factors Vocation Teachers' Pro-industry teaching demand." The questionnaire includes industry development scale, pro-industry self-efficacy scale and pro-industry teaching demand scale [7] [8] [9] [10]. The "Questionnaire of Influence Factors Vocation Teachers' Pro-industry teaching demand" was reviewed by three experts for subject contents suitability to ensure the scale expert validation. Five vocation teachers were invited to answer the questionnaire to enhance the validity of the scales contents. In addition, Ten vocation schools were selected for a pre-test, and 126 teachers were selected as the pre-test objects in total. The scales used in this study are in self-assessment form, and a Likert 5-point scale is used as the scoring method. There are five levels of choices from "agree" to "do not agree" five equal portions of 5, 4, 3, 2 and 1 are given in this order. The higher the score an individual receives, the larger extent of agreement the individual has. The scales factors, number of questions reliability and validity are shown in Table 1.

Factor name	No.	Cronbach α	Factor loading	Total reliability Cronbach α	Accumulated explained variance
Pro-industry self-efficacy scale					
Personal efficacy	4	.89	20.15%		
Teaching efficacy	5	.88	19.23%	.87	58.28%
Industry efficacy	4	.87	18.90%		
Industry development scale					
Industry competition	6	.86	19.98%		
Curriculum reform	4	.87	18.74%	.85	57.73%
Pro-industry teaching	4	.85	19.01%		
Pro-industry teaching demand					
scale					
Teaching practice	5	.87	20.15%	.86	57.55%
Industry practice	4	.86	19.22%		
Pro-industry in-service	4	.88	18.18%		

Table 1. An overview of factors, number of questions, reliability and validity for vocation teachers' industry development, pro-industry self-efficacy and pro-industry teaching demand scale

Data analysis

In processing the survey data used in this study, the collected questionnaires were coded, and Statistical Package for Social Science (SPSS version 12.0) and linear structural analysis (LISREL version 8.5) were used to verify the correlation among the factors of "industry development", "pro-industry self-efficacy" and " pro-industry teaching demand" variables and their effects in order to achieve the purpose of this study. In this study, the statistical test level $\alpha = 0.05$.

Results

The empirical results of vocation teachers' pro-industry teaching demand are shown in Figure 1, and are analyzed as follows:

The estimated value of the direct affecting parameter between industry development and pro-industry self-efficacy is 0.46 (t = 7.28, p<.05). This means that industry development has a significant effect on pro-industry self-efficacy. The estimated value of the direct affecting parameter between industry development and pro-industry teaching demand is 0.86 (t = 6.58, p<.05). This means that industry development does necessarily have a significant effect on pro-industry teaching demand. The estimated value of the direct affecting parameter between pro-industry self-efficacy and pro-industry teaching demand" is 0.54 (t = 7.32, p<.05). This means that pro-industry self-efficacy has a significant effect on pro-industry teaching demand. In summary, in this study of vocation teachers' pro-industry teaching demand and its influence pattern, pro-industry self-efficacy has a significant effect on pro-industry development, but does not have a significant effect on pro-industry teaching demand. Industry development has a significant effect on pro-industry teaching demand. Industry development has a significant effect on pro-industry teaching demand. Industry development has a significant effect on pro-industry teaching demand. Industry development has a significant effect on pro-industry teaching demand. Industry development has a significant effect on pro-industry teaching demand.



Figure 1. Path of influence factors of vocation teachers' pro-industry teaching demand.

Conclusion

Teachers' industry development has a significant direct effect on pro-industry teaching demand, and pro-industry self-efficacy has a significant effect on pro-industry teaching demand through industry development. The influence pattern and empirical data of pro-industry self-efficacy and industry development on pro-industry teaching demand has a good fit.

The influence effects of industry development and pro-industry teaching demand shows that for vocation teachers, the influence of pro-industry self-efficacy on pro-industry teaching demand comes mainly through their awareness of industry development. In addition, industry development has a direct and significant effect on pro-industry teaching demand. From the influence of industry development, pro-industry self-efficacy and pro-industry teaching demand, we can clearly see that compared with industry development has a greater influence on pro-industry teaching demand [11] [12] [13] [14].

Regarding the test results, according to the goodness of fit test standard by Hair et al, the model in this study has a good overall fit [16]. In the absolute fitness and incremental fitness tests, all indices meet the standard, and have the best fit. Most of the parsimonious fitness indices meet the test standard, and have a good fit. Overall, in the pro-industry teaching

demand and its influence model established in the study based on theories, both the model and the data have a good fit, and in the parameter estimation most of the estimated values are significant. This shows that all the indices of latent variables have their importance, and only the parameter value of pro-industry self-efficacy on pro-industry teaching demand is low. Overall, the empirical data have a good explanatory power [15] [16].

The results show that among all latent variables in the model, the direct influence of proindustry self-efficacy on pro-industry teaching demand is not significant, indicating that the assumed influence of pro-industry self-efficacy on teachers' pro-industry teaching demand needs further testing; this is something worthy of a more in-depth study and validation in the future. Based on test results, although the overall result is acceptable, the model consistency level is not entirely satisfactory, and its industry development has a relatively low explanatory power for pro-industry teaching demand.

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