

Curriculum Assessment and Threshold Benchmarking Building in the Perspective of Professional Accreditation

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Abstract. There is a need to establish indicators to evaluate the responsiveness between the curriculum programs and competency standards for engineering cost of Application-oriented Undergraduate in China. From the perspective of professional certification, in order to establish the initial curriculum evaluation benchmarking, this paper analyses the curriculum programs of five universities to find out the problems of curriculums of engineering cost to improve them. Then, this paper interviews experts and peers in engineering cost field to collect their suggestions and revise the initial benchmarking to get the final benchmarking. Research results will provide principles for professional programmatic accreditation as well as threshold standard for curriculum program for the university to set up engineering cost.

Introduction

Professional certification aims to evaluate the curriculum programs and teaching plan of colleges from the perspective of professional education system and tends to evaluate that whether the curriculum programs respond to the basic skills and core competencies mentioned in the professional competency standards [1]. Professional certification also aims to help students achieve capability-oriented goals and outcomes through courses, professional activity [2].

Also, Professional certification adhered to the "minimum" standards, and students' learning outcomes reflect the minimum standards that graduates must meet [3]. To evaluate students' learning outcomes, a set of quantitative standards is needed. So, the paper takes the engineering cost for example and use the dimensions and indicators used to indicate the responsiveness between curriculum programs and competencies to build initial benchmarking of course evaluation through field research on the curriculum programs of colleges. Then, conduct focus group interviews among higher education experts and the industry association experts and amendment to the initial benchmark and finally, we get the final benchmark.

Literature review

The essence of course evaluation is the competency assessment. Curricula arrangement should stress the responsiveness to competency from the perspective of professional accreditation. Courses should be set according to the needs of enterprises and professional competence that graduates should achieve so that students get different levels of capacity [4]. Given that, scholars take the view of ability-oriented advising strengthen the linkages and integration of platform courses and build the core curriculum group. Some scholars point that curricula arrangement should consider the measurable abilities. There should be a clear mapping connection between capacity levels and the curriculum, which means that capacity of any level should be supported by certain courses. So, we should build courses evaluation indicators to evaluate the courses.

Courses evaluation indicators should guarantee that courses respond to ability. Courses evaluation in the perspective of professional certification is a kind of evaluation for the courses and curricula based on competency standards. Srinath Perera and John Pearson developed Competency Mapping Framework (CMF), which evaluate curricula arrangement of engineering cost form width and depth [5]. And domestic scholars also realize that we should evaluate courses form width and depth.

To sum up, curricula evaluation doesn't go deeply enough into the curriculum system responding to the degree of quantitative targets and doesn't clear how to evaluate courses. Researches on the indicators for university courses certification does not go to the quantitative levels. There is no unified standards and basis because of the lack of minimum standards of curriculum evaluation in colleges and universities. Therefore, in order to build indicators that measure the responsiveness between curriculum and competency, this paper integrates competency standard system and course system so that get college access curriculum benchmarks.

Building initial benchmarking of the curriculum evaluation based on cross-case

Establishing cross-case analyzing frameworks and data collecting. Select 5 colleges which are evaluated by double certificate and build the correlation between curriculum and competency system according to ability levels [6]. At the same time, the paper revises and refines width dimensions and depth dimension that respond to competency so that formats evaluation frames of curriculum of engineering cost. And the evaluation frame is shown in Table 1.

Table 1 Capability responding model for professional certification

the width of competency corresponding: A	the priority of courses responding to competency module: A1	the priority of courses responding to basic competency, core competency and developing competency: A11, A12, A13
	the priority of platform: A2	the priority of courses for technology platform, management platform, law platform and economic platform: A21, A22, A23, A24

the depth of competency corresponding: B	course structure: B1	the credit- priority of basic professional course: B11
		the credit- priority of professional course: B12
		the credit- priority of professional required course: B13
		the credit- priority of professional elective course: B14
		the credit- priority of practical teaching: B15
	credits that courses requires: B2	the total credits that all the courses should achieve: B21
		The credits that main courses should achieve: B22

Building initial benchmarking of course evaluation. Combined with the official websites of five universities, the paper gets training programs of five universities through field research and contacting with the persons in-charge of the engineering cost.

Based on this, the paper categorizes and analyzes the data of curriculum of five universities according to the indicators in the model for professional certification and the professional skills modules and system correspondence between professional skills and knowledge system. Then, the paper revises the indicators and we will get the initial benchmarking of course evaluation, which is shown in table 2.

Table 2 initial benchmarking of course evaluation

First-Level indicators	Second-Level indicators	Third-Level indicators	Original data			initial benchmarking
			minimum	highest	average	
A	A1	A ₁₁	35%	47%	43%	A ₁₁ =40%
		A ₁₂	21%	32%	27%	A ₁₂ =35%
		A ₁₃	6%	13%	9%	A ₁₃ =10%
	A2	A ₂₁	25%	44%	33%	A ₂₁ =35%
		A ₂₂	20%	27%	25%	A ₂₂ =25%
		A ₂₃	5%	11%	8%	A ₂₃ =10%
		A ₂₄	8%	16%	13%	A ₂₄ =15%
B	B1	B ₁₁	29%	52%	41%	B ₁₁ =40%
		B ₁₂	22%	43%	30%	B ₁₂ =30%
		B ₁₃	9%	20%	13%	B ₁₃ =20%
		B ₁₄	9%	21%	17%	B ₁₄ =10%
		B ₁₅	27%	33%	29%	B ₁₅ =30%
	B2	B ₂₁	112 credits	135 credits	118 credits	≥110 credits
		B ₂₂	36 credits	45 credits	38 credits	B ₂₂ =40 credits

Establishing the final benchmarking of course evaluation

Collecting advices from the Interview. After the interview on higher education expert,

they make the following recommendations:

First, in order to ensure the cultivation of the core competency, the course proportion of professional courses (B_{13}) and the course proportion of professional elective courses (B_{14}) should be recalibrated. To escape the condition that students choose easier courses and give up on harder courses and make sure to respond to the indicator B_{22} (credits that main courses required), the proportion of professional courses should be increased as well as the proportion of professional elective courses should be decreased and just keep the lowest credits. Five universities can increase elective courses according to their conditions.

Second, if increase the indicator B_{14} , so does the indicator B_{22} (the credits that main courses requires). Meanwhile, we advise that set the courses in the indicator B_{22} as professional courses to solve the confusion of professional courses and lack of uniform standard.

Revising the initial benchmarking of course evaluation. Combined with the experts' opinion, the paper revises the initial benchmarking of course evaluation and build the final benchmarking, which is shown in the table 3.

Table 3 final benchmarking of course evaluation

First-Level indicators	Second-Level indicators	Third-Level indicators	Original data	initial benchmarking	final benchmarking
A	A1	A_{11}	43%	$A_{11}=40\%$	$A_{11}=40\%$
		A_{12}	27%	$A_{12}=35\%$	$A_{12}=35\%$
		A_{13}	9%	$A_{13}=10\%$	$A_{13}=10\%$
	A2	A_{21}	33%	$A_{21}=35\%$	$A_{21}=35\%$
		A_{22}	25%	$A_{22}=25\%$	$A_{22}=25\%$
		A_{23}	8%	$A_{23}=10\%$	$A_{23}=10\%$
		A_{24}	13%	$A_{24}=15\%$	$A_{24}=15\%$
	B	B1	B_{11}	41%	$B_{11}=40\%$
B_{12}			30%	$B_{12}=30\%$	$B_{12}=30\%$
B_{13}			13%	$B_{13}=20\%$	$B_{13}^*=25\%$
B_{14}			17%	$B_{14}=10\%$	$B_{14}^*=5\%$
B_{15}			29%	$B_{15}=30\%$	$B_{15}=30\%$
B2		21	118	≥ 110 credits	$B_{21} \geq 110$ credits
		B_{22}	38	$B_{22}=40$ credits	$B_{22}^* \geq 45$ credits

Summary

The paper analyzes the data of engineering cost courses of five universities and builds the benchmarking of course evaluation in the perspective of professional accreditation so that the assessment of curriculum is more reasonable. From the perspective of professional accreditation, the final benchmarking of course evaluation has the characteristic as follows: 1) the breadth dimension emphasis the response between

complex capacity and training program; 2)the depth dimension emphasis the response between core capacity and training program.

The courses arrangement of engineering cost in domestic university has the following problems and need to be targeted for improvement:

First, the courses arrangement of engineering cost respond highly to basic competency, but needs to ensure the courses that respond to core competency and developing competency to adjust to the changing market and industry.

Second, technology platform is the basic of engineering cost. The knowledge of technology platform, legal platform, financial management platform and contracting management platform should be highly integrated as well as set ability-oriented and modularly.

Third, the curriculum should be arranged from basic competency to core competency to developing competency to enforce the training of comprehensive ability which is needed in practice.

Finally, it is necessary to point out that the benchmark of course evaluation in this paper is the minimum requirements for engineering cost in application-oriented colleges and universities. Every university could stick to the continuous quality-improvement ideas to play their characteristics and advantages to make curriculum innovation according to their own educational background and characteristics based on the benchmark of course evaluation. As a result, colleges will constantly improve the training program and curriculum.

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