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A Study for the Impact of Value Co-creation on Course Performance in Higher Education

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ABSTRACT

Value co-creation has become an increasingly important issue in higher education. Existing studies point out that value co-creation has many effects on students and teaching, but there are few studies on the effects of value co-creation on students' course performance. Whether the degree of instructional value co-creation is reflected in student performance is the main issue of this study. Thus, with the course *Digital Publication Design* as the case study, this study uses a one-way analysis of variance (ANOVA) with a sample of 33 students to investigate the relationship between value co-creation and students' course performance in higher education. The results indicate that the degree of value co-creation in the course does not positively affect the course grade, which may be related to the inadequacy of existing scoring mechanisms and the degree of student motivation to engage in co-creation. The paper concludes with further discussions of modifications to the experimental study to and for subsequent use of co-creation in higher education.

Keywords: Value co-creation, Higher education, Course score, One-way ANOVA

INTRODUCTION

Research on value co-creation is under development and has gained significance from academics (Bharti et al., 2015). Value co-creation can serve for students and schools to work in a shared way to enhance the student experience by improving students' ability to act as partners (Dollinger, Lodge and Coates, 2018). Value co-creation is the process of combining student and organizational resources to facilitate a range of activities and experiences that encourage communication and interaction leading to better practice and innovation (Prahalad and Ramaswamy, 2004). There is still a gap between the theory and practice of value co-creation in higher education.

Value Co-Creation Dimension in Higher Education

Higher education boasts a history of embracing different stakeholders to produce multifaceted outcomes (Kelley, Donnelly and Skinner, 1990). Ranjan and Read (2016) divided value co-creation into two dimensions co-production and value-in-use, a theoretical description that has been supported in earlier studies. They (2016) further revealed six potential elements of

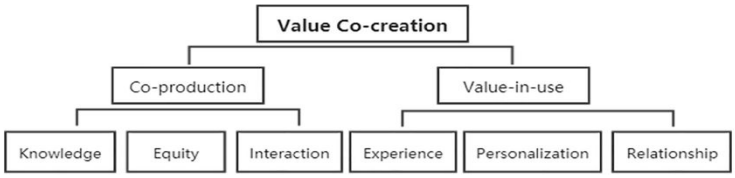

Figure 1: The conceptual dimension of value co-creation proposed by Ranjan and Read (2016).

the above two dimensions, namely Knowledge, Equity, Interaction, Experience, Personalization, and Relationship (see Figure 1). Based on this, Dollinger, Lodge, and Coates (2018) meticulously understand and apply the above dimensions to the field of higher education, elucidating how co-creation can enhance the value of higher education.

Value Co-Creation and Factors Affecting Academic Performance

Co-creation can act as a mediating variable between operational resources and positive outcomes (Bowden and D'Alessandro, 2011). Value co-creation, such as consumer-resource integration, may be abstract and difficult to measure in practice (Pluijm, 2010; Prahalad and Ramaswamy, 2004). Previous studies have assessed value co-creation in higher education from different perspectives, such as improvement in student' achievements (Kasnakoğlu and Mercan, 2020), satisfaction, research capabilities, and institutional and student loyalty, university image, and student-university identification (Dollinger, Lodge and Coates, 2018), in which course satisfaction is one of the factors that influence academic performance. Prior studies have shown that in the context of social media-based college teaching, teachers and students positively influence student satisfaction through value co-creation, which further positively influences student learning achievement (Jiao and Gao, 2018). The relationship between engagement and academic achievement is presupposed to produce different results between low- and high-qualified students and different institutions (Carini, Kuh, and Klein, 2006). Students want to be actively involved in student activities, and they learn more effectively when they are building their knowledge in others aspects (Dufresne, Gerace and Leonard, 1996).

Therefore, this study analyzes the relationship between student achievement and value co-creation in teaching based on the value co-creation dimensions in higher education proposed by Dollinger, Lodge and Coates (2018), and conducts a questionnaire survey on students' value co-creation acceptance, using statistical analysis to derive valid evaluations. From these studies, we can postulate that the degree of value co-creation in the course is positively correlated with course scores.

RESEARCH DESIGN

By compiling the literature and addressing the specificity of the student population in higher education schools and the characteristics of the courses themselves, a questionnaire was developed and collected.

Table 1. Sample characteristics statistics (N = 33).

Background variable	Classification	Number of people
Scores	Pass(65-75points)	11
	Medium(76-85 points)	11
	Excellence(86-95points)	11
		Total:33

Data Collection and Sample Description

The survey is conducted on graduates of the three-year higher vocational education system, who have finished their professional courses and started the internship, a period in which students need to clarify their course plans and career goals (Liu &Yang, 2009). The *Digital Publication Design* selected for this study, a core compulsory course for visual communication majors in higher vocational institutions, integrates the expertise of other design courses, providing sufficient resources to its integration into the co-production stage. And its strong practical nature allows students to be more capable of participating and meets their interactive needs.

A one-way analysis of variance (One-way ANOVA) was used for the experiment to measure the effect of value co-creation on students' scores. The experiment grouped students according to their scores, which were divided into three groups: pass (65-75 points), medium level (76-85 points), and excellence (86-95 points). 40 official questionnaires were distributed and 39 were collected, with a recovery rate of 97.5%. After excluding incomplete samples, the final valid samples totaled 35, with a valid questionnaire rate of 87.5%. To guarantee the validity and the balance of respondents in the three score bands, two people were randomly removed from the group with a higher number, making the number of participants in each group the same (Table 1).

Questionnaires and Scales

The questionnaire consists of 2 parts. The first part is the statistical characteristics of students in the sample, including class, student number, gender, grades, et al.; the second part is the questions related to students' recognition of the value co-creation of the course, which need to center on the learning stage of the course *Digital Publication Design*. This part spans two dimensions, with three sub-processes under each (see Table 2). One is co-production, including knowledge sharing, equity, and interaction, and the other is value-in-use, including experience, personalization, and relationship. A five-point Likert scale is used for the questionnaire, including options like strongly agree, agree, not necessarily, disagree, and strongly disagree, which are divided into "favorable" and "unfavorable" indicators under each. The scoring rule for favorable questions is 1=strongly disagree, 5=strongly agree. Unfavorable questions are scored as 5=strongly disagree and 1=strongly agree.

Table 2. Questions setting related to students' recognition of course value co-creation.

Result variable	Predictor variable	Subvariants of the predictor variables	Questions setting for predictor variables
Degree of co-creation of course value	Co-production	Knowledge	I can incorporate my prior knowledge or experience into this course
			In this course, I can share my knowledge, experience, etc. with teachers or classmates.
			In this course, it is impossible to share knowledge and experience between teachers and students
		Equity	I think I have equal access to participate in this course.
			In this course, my relationship with teachers and classmates is equitable.
			I am treated unfairly during this course
	Value-in-use	Interaction	I can interact with the instructor and classmates in this course
			I can fully participate in this course.
			During the course, I am unable to have a continuous dialogue with the instructor and classmates.
		Experience	This course has brought good experience to me.
			I have a great time in this course.
			This course makes me uncomfortable
		Personalization	This course can meet my individual needs
			The teacher can meet my needs in class
			This course fails to provide support for my unique learning process
		Relationship	In this course, I have a collaborative relationship with the instructor.
			In this course, I have a good relationship with the teacher and my classmates
			I do not get along well with the teacher and my classmates in this course.

Data Processing Method

This study analyzed the data by the statistical tool SPSS and basic statistical methods such as means and standard deviations. The One-way ANOVA method was used to check the variability between students' course scores and course value co-creation.

Students have a better sense of co-creation experience of course values, but there are significant differences in student agreement on the co-production dimension. According to Table 3, the means of all three groups range from 4 to 5, the excellent group scores the lowest in both dimensions, and students produce significant differences in the co-production dimension ($p = 0.011 < 0.05$). And further LSD post-hoc test indicates that there was a significant

Table 3. Descriptive statistics results of the main dimensions of course value co-creation.

	Pass (2.00)M(SD)	Medium (2.00)M(SD)	Excellence (3.00)M(SD)	F-value	P-value
Co-production	4.91(0.17)	4.72(0.33)	4.41(0.50)	5.306	0.011*
Value-in-use	4.73(0.60)	4.83(0.30)	4.45(044)	1.923	0.164

*P< 0.05 is considered statistically significant

Table 4. Co-production LSD post-hoc test results.

Dependent Variable	(I) Scores	(J) Scores	Mean Difference(I-J)	Standard Error	Statistical significance (P-value)
Co-production	1.00	2.00	0.191	0.154	0.471
		3.00	0.496	0.154	0.011*
	2.00	1.00	-0.191	0.154	0.471
		3.00	0.305	0.154	0.156
	3.00	1.00	-0.496	0.154	0.011*
		2.00	-0.305	0.154	0.156

*P < 0.05 is considered statistically significant.

Table 5. Descriptive statistics results for course value co-creation of six dimensions.

	pass (1.00)M(SD)	moderate (2.00)M(SD)	excellent (3.00)M(SD)	F-value	P-value
Knowledge	4.88(0.22)	4.67(0.45)	4.42(0.49)	2.614	0.090
Equity	4.97(0.10)	4.73(0.36)	4.48(0.52)	4.696	0.017*
Interaction	4.88(0.27)	4.76(0.30)	4.33(0.58)	5.430	0.010*
Experience	4.78(0.60)	4.88(0.31)	4.54(0.43)	1.532	0.232
Personalization	4.72(0.61)	4.82(0.35)	4.27(0.59)	3.348	0.049*
Relationship	4.67(0.65)	4.79(0.31)	4.54(0.45)	0.682	0.513

*p < 0.05 is considered statistically significant

difference between the pass group (M = 4.91, SD = 0.17) and the excellent group (M = 4.41, SD = 0.50). The reason for this is that students in the excellent group perceive a slightly lower sense of value co-creation experience in the course than the qualified group, especially in the co-production phase, where students are more pronounced in their ongoing collaboration with the instructor for course design and knowledge output. Next, this study further analyzed the secondary variables of the prediction variables. Table 5 shows the results of descriptive statistics for the six secondary variables in the course value co-creation.

There were differences in the recognition of the 3 sub-dimensions of value co-creation among students in different achievement groups. The results indicate that there are significant differences in dimensions of equity (M = 4.97, SD = 0.10) (p = 0.017<0.05), interaction (M = 4.88, SD = 0.27) (p = 0.010<0.05) and personalization (M = 4.72, SD = 0.61)

Table 6. LSD post-hoc test results for value co-creation of sub-dimensions.

Dependent Variable	(I)Scores	(J)Scores	Mean Difference (I-J)	Standard Error	Statistical significance
Equity	1.00	2.00	0.243	0.158	0.136
		3.00	0.485	0.158	0.005*
	2.00	1.00	−0.243	0.158	0.136
		3.00	0.243	0.158	0.136
	3.00	1.00	−0.485	0.158	0.005*
		2.00	−0.243	0.158	0.136
Interaction	1.00	2.00	0.119	0.174	0.498
		3.00	0.545	0.174	0.004*
	2.00	1.00	−0.119	0.174	0.498
		3.00	0.425	0.174	0.020*
	3.00	1.00	−0.545	0.174	0.004*
		2.00	−0.425	0.174	0.020*
Personalization	1.00	2.00	−0.091	0.226	0.691
		3.00	0.455	0.226	0.053
	2.00	1.00	0.091	0.226	0.691
		3.00	0.546	0.226	0.022*
	3.00	1.00	−0.455	0.226	0.053
		2.00	−0.546	0.226	0.022*

*P < 0.05 is considered statistically significant.

($p = 0.049<0.05$), while knowledge sharing, experience and relationship do not differ significantly.

Post-hoc comparisons of the significantly different dependent variables (Equity, Interaction, and Personalization) reveal that the Equity dimension is statistically significant between the pass group (1.00) and the excellent group (3.00). In the interaction dimension, the excellent group (3.00) is significantly different from both the pass group (1.00) and the moderate group (2.00), respectively. The Personalization dimension shows a significant difference between the medium group (2.00) and the excellent group (3.00). Overall, the excellent group has the lowest ratings and is significantly different from the other groups in all dimensions. From these results, there are differences in students' agreement on whether the teacher-student relationship is equal, whether there is sufficient interaction in the course, and whether the course meets their individual needs, all of which deserve the focus in the teaching of course value co-creation.

CONCLUSION

Course value co-creation is a student-centered measure used to bolster the effectiveness of teaching in higher education. Whether value co-creation affects course performance is the question explored in this study. Descriptive statistics and post-hoc tests of the primary and secondary dimensions of value co-creation in this study led to the following conclusions.

First, students generally accept the value co-creation of the curriculum. According to the statistics, the mean value of each dimension is between 4

and 5, showing an "agree" status, indicating that value co-creation can have a positive effect on teaching and learning. However, there is a bias in acceptance among the pass, medium level, and excellent groups, and the students in the pass group seem to agree more with value co-creation than the students in the excellent group, which contradicts the hypothesis and may stem from the limitations of using achievement alone as a measure. In sum, the existing value co-creation dimensions are conducive to the design of curriculum co-creation activities.

There is no positive correlation between student performance and the degree of value co-creation. According to Table 3, the mean of the excellent group is at the lowest of the three groups, while the mean of the pass group is overwhelmingly the highest of them. In other words, it is not the case that the higher the degree of value co-creation, the higher the course score. The existing scoring mechanism is not developed from a value co-creation perspective but rather judged by the appearance of course outcomes. It is result-oriented, while value co-creation is process-oriented. Kamalasena and Galdolage (2020) have said that researchers need to ensure whether participants have enjoyed the process of value co-creation (process enjoyment). Value co-creation should focus more on the student's process experience, which is more objective.

DISCUSSION AND FUTURE OUTLOOK

Students need strong motivation to engage in curriculum value co-creation and better understand co-creative activities, instead of their readiness for co-production (Kasnakoğlu & Mercan, 2020). The lack of positive correlation between value co-creation identity and achievement in this study may stem from the fact that students may need a certain level of understanding of the curriculum and a strong motivation to participate to effectively synthesize the knowledge, structure, and ideas of the course. Students may fail to distinguish between interpersonal and co-creative acts of participation, they may perceive it as simply participating in classroom discussions (Kasnakoğlu & Mercan, 2020). It was hypothesized that students in the pass group might have a more one-sided understanding of value co-creation, while excellent students would understand co-creative behaviors and judge more objectively, thus making the study results more valuable for research. Meanwhile, teachers should develop different approaches to teach in line with students' abilities and one-on-one instruction can be largely beneficial (Crisp & Cruz, 2009).

Traditional course grades are incomplete as a reflection of the degree of co-creation of value for students. Co-creation value can facilitate the ability of universities and students to work together (Dollinger & Lodge, 2020). It is clear that the focus of co-creating value for students should reset more on the process instead of solely on outcomes. It is advisable for course scoring mechanisms to take this process into account, allowing for a more comprehensive and objective evaluation of students. For the same reason, the assessment of students should focus on their future developmental abilities rather than solely on their academic scores.

In this study, the experiment can be conducted in a class or in the form of a workshop to shorten the length, which can contribute to students' clearer purpose of the experiment and higher motivation to participate, thus focusing more on the value co-creation process. Moreover, the research can be continued by future studies of protocol analysis. They could encode the details of the co-creation design process and results to explore the relationship between how students think and achieve in the class from a value co-creation viewpoint. Thus, the future study could provide suggestions for teaching of value co-creation.

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