

Junior College Impact on the Student  
Majoring Education Field in Japan  
: An analysis of the JCSS2009 dataset from the I-E-O model

Soichiro Aihara  
Osaka Kunei Women's College  
[soi-aihara@kun.ohs.ac.jp](mailto:soi-aihara@kun.ohs.ac.jp)

## Abstract

In recent years, Researchers have been trying to expand Astin's I-E-O model and theory of Involvement. In this study, we present the comprehensive conceptual model for JCIRP which are depending on Astin's concepts and synthesizing the two models advanced by Hurtado and Terenzini. Our comprehensive conceptual model is customized in order to use it in Japanese higher education system and is maintaining both comprehensiveness on cognitive and emotional aspects of CIRP survey and utility on operationalize to empirical research of NSSE survey.

In this presentation we analyze the determinants of learning outcomes of the junior college students who major in education field on the JJCSS 2009 dataset which comes one of the JCIRP survey conducted at November 2009. First, changes of competencies and knowledge compared with entrance point are used for the indicators of learning outcomes. Second, learning outcomes are divided through factor analysis into three categories, 1) basic special knowledge, 2) contemporary general knowledge, 3) classic general knowledge. Third, the determinants of basic special knowledge are examined through multiple regression analysis on the I-O model and the I-E-O model which are both come from JCIRP conceptual framework. The analysis proved that the determinants of Student Involvements which are made up of the environmental factors after entrances is strong, among them to learn study skills through student engagement and to construct of peer-group relationships are especially strong to enhance learning outcomes. Furthermore, we intend to present the causal model which relies on the comprehensive conceptual model for JCIRP through the structural equation modeling(SEM).

## 1 . Purpose of the Study

There are global interests among many countries to assess the learning outcomes in Higher Education. Kawashima (2009) reviewed these trends and pointed out that the enhancement of learning outcomes brings to the paradigm shifts which are transforming from the educational paradigm to the learning one. Under such a background longitudinal student surveys are conducting at many countries. In the U.S. the Cooperative Institutional Research Program (CIRP) which is hosted by the Higher Education Research Institute (HERI) at the University of California, Los Angeles of the Graduate School of Education and Information Studies and the National Survey of Student Engagement (NSSE) which is hosted by the Center for Postsecondary Research (CPR) in the Indiana University Bloomington of the School of Education are well known. In the Japan the study group of Yamada, she is a Principal Investigator of this study, has developed the Japanese version of CIRP (JCIRP) and has conducted their survey which is hosted by Higher Education and Student Research Center at the Doshisha University. The research group of Kaneko has also conducted the College Student Survey (CSS) which is hosted by the Department of University Management and Policy Studies (CRUMP) at the University of Tokyo.

The leading conceptual framework on which longitudinal student surveys are based is the I-E-O model; this model was made by Astin, A. W. the former head director of HERI. To begin the first I (Inputs) means the before entrance student characteristics, the second E (Environment) means educational programs, university policy, faculty & staff, peers, and other after entrances student experiences which construct of environment. Then the third O (Outcomes) means learning outcomes of college education (cf. Astin, 1993, p.7). The most critical determinant of learning outcomes according to Astin is the Student Involvement which constitutes environmental factors. The Student Involvement means “how much time, energy, and effort students devote to the learning process” (Study Group on the Conditions of Excellence in American Higher Education, 1984, p.17).

Astin’s I-E-O model and theory of Involvement prepared the foundations for subsequent studies. As Pascarella & Terenzini, however pointed out these displayed the directions of research but it is remained the task to theorize under strict sense of science. It is also true from the viewpoint of practical usefulness there are open to questions to elaborate the conceptual framework as a tool to improve learning outcomes. For example, Hurtado she is the present head director of HERI, begins new project that is the Diverse Learning Environments (DLE) Survey which focused races/ethnic diversity. Terenzini et al. constructed the conceptual framework which focused student experiences among environmental factors. As for our research

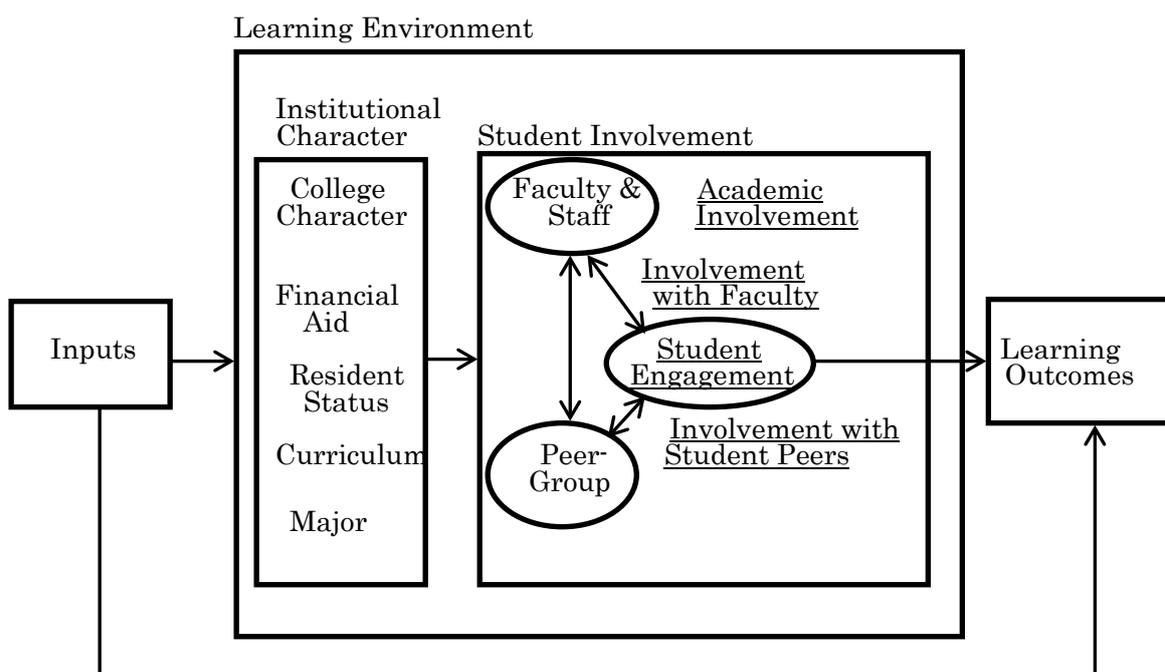
group, Yamada (2009) elaborated the I-E-O model based on the Pascarella model and Sugitani (2009) analyzed datasets focusing on the student type.

In this presentation we present comprehensive conceptual framework for JCIRP which is depending on Astin's I-E-O model and theory of Involvement on one side and are synthesizing the conceptual framework of Hurtado and Terenzini on the other. Then we analyzed the determinants of learning outcomes of junior college students from the JJCSS 2009 datasets.

## 2. Comprehensive Conceptual Framework for JCIRP

Figure 1. is the comprehensive conceptual framework developed for JCIRP. This conceptual framework adopts the concepts from the study of Hurtado for CIRP and the framework from the study of Terenzini for NSSE, and customizes to use it in Japanese higher education system. If we compared two studies CIRP and NSSE, the items of NSSE asked mainly the behavioral side of students. It is easy to answer the questions and the framework is simple to understand and operationalize to empirical research. On the other hand the items of CIRP asked not only the behavioral aspect but also the cognitive and emotional aspects of student. It takes a lot of time to answer the questions and the framework is complicated because they added the element of inner world such as identity and it is difficult to operationalize to empirical research. The comprehensive conceptual framework for JCIRP made to adopt both merits, it is described below.

Fig.1. Comprehensive Conceptual Framework for JCIRP



\* ( ) indicates the items which are not in the JCIRP.

### **Inputs**

- Personal Attribute : gender, age, admission year, first generation, international student (race/ethnicity, family income, parent' s education level and occupation, marital status, nationality, religious and political preferences)
- Secondary Education : High school grade, Control, Coeducation, High school experience (High school type and curriculum)
- Attendance Behavior : reason of college attendance, aspiration, order of choice, decision making period, admission type

### **Learning Environment**

\*Astin (1993) divided Environment area into eight subareas: characteristics of institutions; curriculum; faculty; the peer group; residence; major; financial aid; and student involvement (p.32). He divided further the student involvement into five regions: academic involvement; involvement with faculty; involvement with student peers; involvement in work; and other forms of involvement (p.71). In the framework for JCIRP, the major subarea moves into Inputs areas and two regions, involvement in work and other forms of involvement integrated to academic involvement. Furthermore we add staff into faculty subarea and make them as faculty & staff. The analysis of this time we didn't examine of characteristics of institutions, curriculum, faculty, and the peer group as Astin (1993) examined those.

### **Institutional Character**

- College Character: (control, size, history, mission, classification, selectivity, condition of education, admission policy, curriculum policy, graduation policy, faculty salary, ratio of the education expenditure to gross expenditure, and so on)
  - Financial aid: acceptance various kinds of scholarship
  - Resident Status: living with family or dormitory, commuting time
- \*A lot of first - year student are entering dormitory in the U.S. In the Japan, however, most of junior college students are commuter student.
- Curricula: (Character of general education, distinctive features educational program)
  - Major : Major located in Institutional Character at Learning Environment area of Astin's framework. In this analysis we use only datasets of education major field because of each major has their own peculiarity.

### **Student Involvement**

- Academic Involvement: behavioral involvement of students, such as taking classes on curricula and co-curricular, time allocation and frequencies of learning activities, job searching and so on.
- Involvement with faculty and staff: especially cognitive and emotional support from faculty and staff.

- Involvement with student peers: especially cognitive and emotional relation with peer-group.
- Student Engagement: cognitive and emotional involvement of students, such as acquiring academic skills, student type, adaptation of students related to uneasiness of student life, pressure, and the degree of fullness.
- \* Acquiring academic skills are also outcomes after entrance. According to Astin (1993), these are intermediate outcomes. Intermediate outcomes can be dealt with properly as environment factors if we make them into blocks in time series.

### **Learning Outcomes**

- College grade, cognitive and emotional development, changes of values, behaviors and self-esteems, campus satisfaction, aspiration of degree and occupation, intention of re-entrance. (Degree acquisition, various kinds of test score, income after graduation)
- \* Learning Outcomes of JCIRP are indirect self-assessment. Astin (1993) also used objective test scores those are direct assessment.

## **3 . Junior College Impact on the Students Majoring in Education Field**

We examine the junior college impact on the learning outcomes of the students who are majoring education in Japan through JJCSS2009 datasets in this latter half of report. Total sample size of our examination is 2,419 students, first-year students are 1,242 and second-year students are 1,177 respectively. There are special characteristics in each of majors then we need to control these majors to examine the impact of junior college.

### **(1) Learning Outcomes of the Students at Junior College in Education Major**

Table 1 shows the changes of competency and knowledge compared with the time of entrance for students who are majoring in education at junior college. For example “Knowledge of a particular field or discipline,” 81% of junior college student majoring in education field has answered on the whole “Much Stronger” or “Stronger.” This increment is not maturity but as a result of junior college education. As for school year first-year students are 76% and second-year students are 87% respectively, the differences are 11 points which are increasing from first grade to second grade. The increment of every item is increasing at second grade that shows satisfactory progress of junior college education. Besides “Knowledge of a particular field or discipline,” “Ability to carry things out with cooperate other people” and “Ability to build human relations,” shows large progress. It is expected that junior college in education field educate students with emphasis on human relationship, and there are closely relate among knowledge of special field, discipline, and general education.

### **(2) Factor Analysis of Learning Outcomes**

Table 2 displays the result of factor analysis of learning outcomes for junior

**Table 1 Learning Outcomes of Junior College  
in Education Major**

	Junior College Student Majoring Education			
	First- Year	Second- Year	Changes	
Knowledge of a particular field or discipline	81%	76%	87%	11
Ability to carry things out with cooperate other people	66%	60%	73%	13
Ability to build human relations	66%	60%	71%	11
General knowledge	64%	60%	67%	7
Ability of communications	61%	54%	68%	13
Preparedness for graduate	59%	49%	71%	22
Computer skills	49%	46%	53%	7
Analytical and problem-solving skills	49%	42%	57%	15
Ability to manage your time effectively	49%	45%	53%	7
Writing skills	46%	41%	50%	8
Ability to think critically	42%	39%	46%	7
Leadership abilities	39%	33%	45%	12
Ability of presentations	35%	30%	39%	9
Understanding of the problems facing your community	34%	26%	43%	16
Knowledge of people from different cultures	33%	29%	38%	9
Understanding of social problems facing our nation	32%	26%	38%	11
Understanding of global issues	21%	18%	25%	7
Ability to get along with people from different cultures	20%	17%	24%	6
Foreign language ability	17%	17%	18%	0
Mathematical skills	11%	10%	12%	2

\* Item 22. The ratio of answered student as "Much Stronger" "Stronger."  
There is rounding error.

**Table 2 Factor Analysis of Learning Outcomes**

	Basic Special Knowledge	Contemporary General Knowledge	Classic General Knowledge
1 Ability to carry things out with cooperate other people	.745	.176	-.019
2 Ability to build human relations	.736	.139	.038
3 Ability of communications	.695	.180	.210
4 Preparedness for graduate	.559	.160	.154
5 Knowledge of a particular field or discipline	.549	.173	-.011
6 Analytical and problem-solving skills	.543	.196	.293
7 Leadership abilities	.542	.155	.225
8 General knowledge	.522	.162	.263
9 Ability to manage your time effectively	.520	.152	.271
10 Writing skills	.479	.282	.362
11 Ability of presentations	.473	.211	.386
12 Understanding of social problems facing our nation	.247	.818	.138
13 Understanding of the problems facing your community	.293	.747	.152
14 Understanding of global issues	.175	.683	.347
15 Ability to get along with people from different cultures	.223	.403	.351
16 Foreign language ability	.139	.209	.667
17 Mathematical skills	.089	.144	.656

Note) Factor Extraction Method: Principal Axis Factoring, Rotation: Varimax Method,  
Items were selected above the Factor Loading.400, Cumulative Contribution=48%.

**Table 3 Multiple Regression Analysis of Learning Outcomes on Basic Special Knowledge**

			I-O Model			I-E-O Model		
			B	SE	$\beta$	B	SE	$\beta$
befor entrance	Student Information	gender	.087	.082	.023	.030	.069	.008
		order of choice	.204	.054	.082 **	.065	.046	.026
		high school grade	.096	.017	.125 **	.043	.014	.056 **
after entrance	Academic Involvement	Missed class due to part-time job				-.068	.023	-.057 **
		Had difficulty getting the courses you needed				-.063	.025	-.049 *
		Played a musical instrument				.058	.015	.073 **
	Involvement with Faculty and Staff	Emotional support and encouragement				.078	.023	.076 **
		Help in achieving your professional goal				.104	.024	.097 **
learning environment	Involvement with Student Peers	Interaction with other students				.151	.027	.144 **
		Overall sense of community among students				.153	.025	.152 **
	Student Engagement	Develop effective study skills				.179	.031	.133 **
		Manage your time effectively				.215	.029	.165 **
constant								
			-.712	.135	**	-2.851	.154	**
R <sup>2</sup>						.024		
AdjustedR <sup>2</sup>						.022		
						.321		
						.317		

Note: \* significance level 5%, \*\* significance level 1%

college students. Items were selected above the factorloading.400 and three factors identified from seventeen items. After the naming of precedence research (Yamada, 2009) these factors are called basic special knowledge, contemporary general knowledge, and classic general knowledge.

### (3) Multiple Regression Analysis on Learning Outcomes

Table 3 shows the determinants through multiple regression analysis on the basic special knowledge among learning outcomes. The following results were obtained from the I-O model and I-E-O model. First of all I should mention that the variables of reason of college attendance which located at attendance behavior of input area have omitted to make this analysis simplify. These variables have significant effects on the learning outcomes, however it makes complicated explanation.

**I-O model:** This model explain outcomes of the basic special knowledge with the before entrance characteristics of students such as gender, order of choice, and high school grade. It is statistically significance but the coefficient of determinationR<sup>2</sup>shows this model explains about 2% of this learning outcome. Concerned with explanatory variables it is suggested that gender is not significance because most of junior colleges in education field are women's college, then order of choice and high school grade are significance. That explains outcomes of the basic special knowledge in education field increase if students are first-choice and are good at high school grade.

**I-E-O model:** This model explains outcomes of the basic special knowledge with the before entrance characteristics of students and after entrance learning environment of their campuses. After entrance learning environment consist of four blocks, these are academic involvement, involvement with faculty and staff, involvement with peer-group relation, and student engagement. Variables were selected through stepwise method.

Coefficient of determination  $R^2$  shows this model explains about 32% of this learning outcome and it is statistically significant. The high school grade is still statistically significant as for before entrance characteristics, however standardized regression coefficient  $\beta$  indicates that the effect of high school grade is the smallest among the statistically significance positive effects. As for the after entrance learning environment the effect of involvement with student peer, “Interaction with other students” (.144), “Overall sense of community among students” (.152) and the effect of student engagement, “Develop effective study skills” (.133), “Manage your time effectively” (.165) are strong determinants. The effects of involvement with faculty and staff, “Emotional support and encouragement” (.076) and “Help in achieving your professional goal” (.097) are also significant determinants. Furthermore as to academic involvement “Missed class due to part-time job” (-.057) and “Had difficulty getting the course you needed” (-0.49) are negative effect, “Played a musical instrument” (0.73) is positive effect.

We can summaries that high school grade that is before entrance factor determines significantly, however after entrance college environment especially involvement with students peer and students engagement to exquisite of learning skills have more significant effects on the formation of basic special knowledge in the education field of junior college.

## 【References】

(English)

- Astin, A. W. (1993). What Matters in College? Four Critical Years Revisited. San Francisco: Jossey-Bass.
- Pascarella, E. T. and P. T. Terenzini (2005). How College Affects Students: A Third Decade of Research, Jossey-Bass.
- Study Group on the Conditions of Excellence in American Higher Education (1984). Involvement in Learning: Realizing the Potential of American Higher Education. U.S. Government Printing Office, Washington, DC 20402.
- Terenzini, P. T. and R. D. Reason (2005). Parsing the First Year of College: A Conceptual Framework for Studying College Impacts. Paper presented at the annual meeting of the Association for the Study of Higher Education, Philadelphia, PA.

(Japanese)

- Aihara Soichiro (2010). "Campus Climate and Diverse Learning Environment: An Examination of the Hurtado's Conceptual Framework," Research Journal (Kenkyu Kiyou), Vol.45, Osaka Kunei Women's College, pp.21-28.
- Ogata Naoyuki (2008). "Student Engagement and College Outcomes," Japanese Journal of Higher Education Research, No.11, pp. 45-64.
- Kawashima Tatsuo (2009). "International Trend toward Outcomes-Based Approach in Higher Education." Comparative Education, No.38, pp.114-131.
- Kaneko Motohisa (2009). "Alternative Models for Relating Evaluation and Improvement –Standardized Outcome Assessment vs. Process Monitoring-, University Evaluation Review, No.8, pp.17-29.
- Sugitani Yumiko (2009). "Between Student Comparison after Entrance Experience and Educational Effect," Science on College Education: International Comparison on Educational Assessment of Students, Yamada Reiko ed., Tokyo: Toshindo, pp.63-83.
- Yamada Reiko ed. (2009). Science on College Education: International Comparison on Educational Assessment of Students, Yamada Reiko ed., Tokyo: Toshindo.
- Yoshida Aya (2008). "Aspects of Research on University Students," Japanese Journal of Higher Education Research, No.11, pp.127-142.