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RESEARCH ARTICLE

CEN Yuhao

A Taxonomy of College Student Learning Outcomes in China: A Multi-Institutional, Mixed-Method Study

Abstract This mixed methods study investigates learning outcomes resulting from college attendance in the Chinese mainland. Data for this study is derived from undergraduate survey responses at 21 universities and interviews with 64 seniors at five universities. Factor analysis reduced learning outcome items to two factors, and 19 categories of learning outcomes were distilled from interview data. These categories were then reduced to four domains: knowledge, skills, intrapersonal awareness, and interpersonal competence. Compared with literature generated in the West, intercultural competency as well as quantitative and computer literacy are missing in the Chinese higher education context. Student learning is an integrated whole and takes place in diverse settings in and outside the classroom.

Keywords learning outcomes, college students, mixed methods study, college experiences

Introduction

The outcomes for individuals enrolling in higher education institutions have long been of interest to researchers and policymakers. Outcome research on benefits for individual college-goers is long-standing and voluminous in the U.S. context (see Feldman & Newcomb, 1969; Pace, 1979; Pascarella & Terenzini, 1991, 2005). Short-term outcomes for individuals, such as college persistence and learning, as well as outcomes that occur much later in life, such as civic or

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CEN Yuhao (✉)
Graduate School of Education, Shanghai Jiao Tong University, Shanghai 200240, China
E-mail: ycen@sjtu.edu.cn

workforce participation, have been linked to developmental processes and college experiences of college-goers. Different from student outcomes that generally refer to aggregate statistics regarding groups of students, student learning outcomes encompass a wide range of student attributes and abilities, both cognitive and affective, reflecting how their college experiences have supported their development as individuals (Frye, 1999). For example, Kuh (1993) identified five outcome domains from college senior interviews in the US: personal competence, cognitive complexity, knowledge and academic skills, practical competence, and altruism and estheticism. The Wabash National Study associated liberal arts education with seven integrated learning outcomes: integration of learning, inclination to inquire and lifelong learning, effective reasoning and problem solving, moral character, intercultural effectiveness, leadership, and well-being (King, Brown, Lindsay, & Vanhecke, 2007). Degree Qualifications Profile describes what postsecondary degrees should mean in terms of learning outcomes, and it identifies five essential areas of learning associated with earning a bachelor's degree: specialized knowledge, broad and integrative knowledge, intellectual skills, applied and collaborative learning, and civic and global learning (Lumina Foundation, 2014).

Student learning outcome research has the potential to justify public funding and individual investment in higher education. Educators, parents, and other stakeholders desire to know in what ways and to what extent college students have changed as a result of college attendance. Accompanying the massification of postsecondary education systems globally is a rising number of student learning outcomes studies on the policy agenda of higher education around the world (AACU, 2005; Australian Department of Education Science and Training, 2004a, 2004b; Tremblay, Lalancette, & Roseveare, 2012; OECD, 2013; HEFCE, 2008; Zis, Boeke, & Ewell, 2010).

Like its counterparts worldwide, the higher education sector in China endeavors to improve quality as its quantity goals in college enrollment are being reached. During the past decade, Chinese higher education has undergone unprecedented reform and expansion, with an upsurge in college enrollment, diversification of institutions, and devolution of higher education finance. As the nation's role in the global labor market and academic research arenas expands and the higher education landscape evolves from elite education toward massification (Min, 2004; Trow, 1973), the missions of universities have

diverged and broadened. These changes are reflected in diverse societal and individual expectations of college attendance. Higher education scholars in China have offered conceptual discussions on what learning outcomes students should achieve, often referring to frameworks in the West (Bai, 2012; Xu & Li, 2011). Yet few empirical studies have been conducted to answer the most basic question in contemporary Chinese higher education: What did Chinese students learn or expect to learn from their college experiences?

This study seeks to provide a detailed account of and classify learning outcomes as perceived by college students in the Chinese mainland. The purpose is to generate a trustworthy picture of the perceptions and experiences of learning for undergraduates as shared by the students themselves.

Method

This study uses a mixed methods research design, a procedure for collecting, analyzing, and mixing or interpreting both quantitative and qualitative data at some stage of the research process within a single study (Creswell, 2012). The rational for mixing both types of data is that neither quantitative nor qualitative methods are sufficient by themselves to provide a general and detailed picture of the research problem, such is the complexity of drawing insight into student learning and development from college attendance.

Study Design

This study uses an exploratory sequential design that consists of two distinct phases: quantitative followed by qualitative (Creswell & Plano Clark, 2011). Survey data was first collected and analyzed, followed by interview data to elaborate on the quantitative results. The student interview data refines and explains the categories derived from the survey data by exploring participants' views in more depth.

Quantitative Phase

Survey Sample

Quantitative data for this study came from the 2009 administration of the

National Survey of Student Engagement-China (NSSE-China), adapted from NSSE in the US. The cultural adaptation and validation process are reported elsewhere (see Luo, Ross, & Cen, 2009; Ross & Cen, 2012; Ross, Cen, & Shi, 2014).

NSSE-China 2009 used local paper survey administration in 27 voluntarily participating institutions. A random sample of undergraduate students at each institution was invited to participate, and the overall response rate was 82%. Twenty-one public baccalaureate institutions were included in the analysis, and they generally mirrored the distribution of public baccalaureate institutions in China in terms of geographic region, level of state supervision, and selectivity (Table 1).

Table 1 Universities Included in the Survey Data

	NSSE-China 2009		Public Baccalaureate Regular Higher Education Institutions 2009	
	N	%	*N*	%
Geographic region				
Northeast China	3	14.3%	87	12%
Northwest China	2	9.5%	64	9%
Southwest China	2	9.5%	85	12%
Southeast China	2	9.5%	58	8%
Central China	2	9.5%	108	15%
North-central China	6	28.6%	174	24%
East China	4	19.1%	144	20%
Selectivity				
211 Institutions	11	52%	112	16%
(Among which, 985 Institutions)	(5)	(24%)	(39)	(5%)
Others	10	48%	608	84%
Administered by				
Central government	6	29%	106	15%
Provincial or municipal government	15	71%	614	85%
Total	21	100%	720	100%

The student sample in this analysis comprised 23,016 students, within-institution sample size ranging from 674 to 1,574. Over 40% were female, 9.54% were from ethnic minorities, 59.84% were engineering or science majors (Table 2).

Table 2 Demographic Characteristics of Survey Respondents

Respondent Characteristics	*N*	%
Gender		
Male	13,773	59.84%
Female	9,234	40.12%
(Missing)	9	0.04%
Ethnicity		
Han	20,795	90.35%
Ethnic minorities	2,195	9.54%
(Missing)	26	0.11%
Year in school		
First-year students	6,767	29.40%
Sophomores	6,205	26.96%
Juniors	5,726	24.88%
Seniors	4,294	18.66%
(Missing)	24	0.10%
Urbanicity of hometown		
Metropolitan cities	3,410	14.82%
Provincial capitals	2,326	10.11%
District-level cities	3,810	16.55%
County-level cities	3,772	16.39%
Countryside	9,355	40.65%
(Missing)	343	1.49%
Major field		
Physical science	1,676	7.28%
Agriculture	1,181	5.13%
Medicine and Pharmacy	394	1.71%
Engineering	11,852	51.50%
Humanities and arts	2,148	9.33%
Social sciences	1,665	7.23%
Education	455	1.98%
Business and management	3,072	13.35%
Undecided	547	2.38%
(Missing)	26	0.11%

Note. Major fields were coded from self-reported primary majors.

Survey Instrument

NSSE-China elicited information about college experiences conceptualized as engagement, learning outcomes, satisfaction, career and educational aspiration in

addition to demographic information. Pertaining to learning outcomes, the core questions were constructed in the following set of 12 items: "To what extent has your experience at this institution contributed to your development in the following areas (*very little*, *some*, *quite a bit*, *very much*)?"

a. Acquiring a broad general education;
b. Acquiring disciplinary knowledge and skills;
c. Communicating clearly and effectively;
d. Developing awareness and ability to innovate;
e. Time management;
f. Learning effectively on your own;
g. Solving complex real-world problems;
h. Developing a personal code of values and ethics;
i. Working effectively with others;
j. Understanding yourself;
k. Appreciating beauty;
l. Using computing and information technology.

This question set asked students' perceptions of gains from college. Although some researchers and policy makers traditionally have less confidence in these softer, more subjective measures, others see the merit of using self-reported survey data (Douglass, Thomson, & Zhao, 2012; Gonyea, 2005). Without excluding other ways of gauging learning outcomes, designed properly, college student surveys offer a valuable and more nuanced alternative for understanding and identifying learning outcomes. In this study, students' survey responses constitute part of the data, followed by a qualitative phase.

Qualitative Phase

Participants

Maximal variation sampling was used to sample interview participants. Five among the 21 survey institutions were selected as interview sites, and they varied in geographic location, selectivity, disciplinary focus, and size (Table 3).

Table 3 Universities Included for Student Interviews

University	City	Region	Tier	Type	Undergraduate Enrollment	Individual interviews	Focus Group (# of participants)
A	Shenyang	Northeast China	Province-level	Science and Technology	11,000+	8	1 (3)
B	Zhengzhou	North central China	Province- level	Science and Technology	16,000+	7	1 (3)
C	Shanghai	East China	City-level	Teacher Education	24,000+	8	1 (3)
D	Guangzhou	Southeast China	City-level	Comprehensive	20,000+	8	1 (3)
E	Nanning	Southeast China (less developed)	“211”	Comprehensive	22,000+	8	1 (3)

Fourth-year students who had participated in the NSSE-China 2009 survey were invited for interviews, and a few non-participants responded to open advertisement with strong interest. In all, 49 individual interviews and five focus group discussions were conducted with 64 seniors: 33 women; 35 science or engineering majors, and 29 arts, humanities, or social sciences majors; all of traditional undergraduate age (18–23); and 55 had completed the NSSE-China survey. Regarding post-college plans, 45 wanted to work after graduation, and 19 wanted to pursue graduate study immediately after college, among whom three had already been admitted and one was applying overseas.

Interviews

Conducted on campus, individual interviews lasted one hour, and group interviews lasted 1.5 hours. Interviews were semi-structured and constructed in situ as the conversation unfolded. The questions focused on learning about a student's gains and experiences in college. Open-ended interview questions including "what have you learned from your college life," "how have you changed in college" and "in what aspect have you grown in college" were designed to elicit participants' response on learning outcomes. Each group interview had three participants: Both male and female were included, they came from different academic programs and they had not met before. Focus group interviews worked best when the participants shared the same institutional environment but did not know each other (Patton, 2002, p. 387). Interviews were audio-recorded and transcribed verbatim.

Analytic Strategy

Quantitative data and qualitative data were analyzed separately. For quantitative data, descriptive statistics were generated and factor analysis was used to extract domains of learning outcomes. Qualitative data analysis started as early as during data collection. First, relevant passages on important benefits of college attendance were highlighted for analysis. A further review of the passages yielded a set of codes, and the codes were aggregated into categories. The categories were expanded, collapsed, folded, and modified continuously. After reviewing about half of the transcripts, the outcome scheme appeared saturated. At this point, the categories were compared with survey items falling into the

categories derived from quantitative analysis, which resulted in an initial scheme of domains and categories of learning outcomes. Next, I applied the scheme to the reading of other transcripts, so as to reflect on how well the initial scheme accommodated the outcomes contained in a new transcript, made revisions and compared them with the quantitative findings. This process of constant comparison continued until all the interview materials were reviewed and each manual code on learning outcomes found its appropriate place in the categories. The final taxonomy that emerged comprises four domains and 19 categories of learning outcomes.

Quantitative and qualitative data informed each other reciprocally in the analysis process. The categories emerging from the interviews provided "meaty" content and concrete examples that elaborated the survey items loaded on each factor. Vice versa, the factors extracted from survey items captured the scopes of the categories derived from interviews and suggest four domains to which the 19 categories were further reduced.

The trustworthiness of the data and results was enhanced through multiple means, including audit trail, member checking, and peer debriefing (Creswell & Miller, 2000). The transcripts and the first draft of this paper were sent to interviewees for eliciting feedback. The learning outcome scheme and supporting evidence were shared with other qualitative researchers, to ensure that my interpretation of the interviews reached a certain extent of agreement with others'.

Results

The first section presents an outcome taxonomy produced by the factor analysis and inductive analysis of interviews. The second section uses the words of selected participants to describe the areas of learning considered important to themselves.

Outcome Taxonomy

Factor Analysis

The maximum likelihood method was used to extract the factors, followed by

promax (oblique) rotation. Prior to the factor extraction, principal components analysis was used to estimate the number of factors with a scree test, to assess absence of multicollinearity with SMC statistics, to examine the correlation matrices and Kaiser's MSA statistics for assessing factorability, and to check outliers among variables.

The factor analysis reduced the 11 outcome variables (excluding *using computing and information technology*) to two factors (Table 4). Six items, acquiring disciplinary knowledge and skills, developing awareness and ability to innovate, communicating clearly and effectively, time management, acquiring a broad general education, and learning effectively on one's own, were loaded on the first factor, which was accordingly labeled as Knowledge-skill Gains. Five items, understanding yourself, developing a personal code of values and ethics, appreciating beauty, working effectively with others, and solving complex real-world problems were loaded on the second factor, labeled as Personal-social Gains. Items had a primary factor loading of at least .40, and no variable loaded on both factors. The two dimensions also demonstrated good internal consistency (α = .80 for Knowledge-skill Gains, α = .82 for Personal-social Gains).

Table 4 Factor Loadings of the Learning Outcome Survey Items

	Factor Loading	
Item	F1 (Knowledge-skill Gains)	F2 (Personal-social Gains)
Acquiring disciplinary knowledge and skills	0.63	
Developing awareness and ability to innovate	0.62	
Communicating clearly and effectively	0.59	
Time management	0.54	
Acquiring a broad general education	0.50	
Learning effectively on your own	0.47	
Understanding yourself		0.77
Developing a personal code of values and ethics		0.73
Appreciating beauty		0.60
Working effectively with others		0.44
Solving complex real-world problems		0.44

Note. a) N = 22,122, after listwise deletion and removal of multivariate outliers; b) Only factor loadings of 0.40 or above are presented in the table.

Inductive Analysis

The inductive analysis of the transcribed "voices" of 64 seniors yielded a scheme of learning outcomes containing 19 categories in four domains (Table 5).

Table 5 Taxonomy of Learning Outcomes

Domain		Category
Knowledge	1	Acquiring disciplinary knowledge (includes knowledge application);
	2	Acquiring a general education;
	3	Acquiring and developing hobbies;
	4	Acquiring knowledge about real-world life outside college;
Skills	5	Learning on one's own;
	6	Practical competence (includes obtaining information, time management, and budgeting);
	7	Speaking in public;
	8	Reflective thinking (includes critical thinking, creative thinking, analytical thinking, independent thinking, developing multiple views, seeing others' views);
Intrapersonal Awareness	9	Understanding oneself (includes strength and weakness, and sense of purpose);
	10	Developing qualities and personalities (includes persistence, self-discipline, concentration, assertiveness, patience, tolerance, confidence, optimism, becoming extroverted, and "letting go");
	11	Developing sense of responsibility (includes taking initiative and responsibility for one's own affairs and learning, responsibility for family and friends, for community, for work);
	12	Developing a personal code of values and ethics;
	13	Appreciating beauty;
Interpersonal Competence	14	Expanding social network (includes presenting self, and interacting with strangers);
	15	Addressing needs (includes asking questions, seeking help, and declining requests);
	16	Teamwork and leadership (includes coordination and negotiation, and accommodating diverse needs and potentials);
	17	Solving complex real-world problems (includes dealing with failure and frustration, resolving friction and conflict, and handling emergency);
	18	Developing intimacy;
	19	Understanding others.

The four outcome domains were (categories in each domain in parenthesis): Knowledge (disciplinary knowledge + general education + hobbies + knowledge about real-world life), Skills (learning on one's own + practical competence +speaking in public + reflective thinking), Intrapersonal Awareness

(understanding self + qualities and personalities + sense of responsibility + values and ethics + aesthetics), and Interpersonal Competence (networking + addressing needs + teamwork and leadership + solving real-world problems + capacity for intimacy + understanding others). The first two domains corresponded to the factor of Knowledge-skill Gains, and the next two corresponded to the factor of Personal-social Gains.

In Their Own Words

The voices of students illustrate what they have learned and how they have changed during college in four outcome domains.

Knowledge

Knowledge refers to facts, ideas, and understandings of external world acquired through study or experience. The scope of knowledge was captured by Zhang in a metaphor:

> If I draw vertical lines within a triangle, I hope the longest line in the middle represents my disciplinary knowledge. The closer to the sides, the shorter the lines. They represent the fields I'm interested in and want to explore. As I graduate, I will have a perfect isosceles triangle with lines of various lengths in it. (Zhang, male, safety engineering major, university A, personal communication, November 8, 2010)

Zhang's goal of acquiring disciplinary knowledge, a general education and hobbies was "partially achieved," yet his vision was typical among participants. The isosceles triangle reflected a common theme that Chinese college students expected to acquire multiple types of knowledge and to expand knowledge horizon beyond subject matters.

- *Acquiring Disciplinary Knowledge*

Mastery of disciplinary or subject matter knowledge is the foremost educational objective for students and even their families. Wen in university C recalled a family celebration as she entered a teacher education program:

> Both teachers, my grandpa and my aunt expect me to master the knowledge and skills required to be a qualified teacher. The only thing in my mind about college then was *haohao xuexi*, *tiantian xiangshang* [study hard and make progress every day]. (Wen, female, teacher education, university C, personal communication, November 24, 2010)

Having discovered a whole arena of knowledge beyond classroom learning, Wen still kept curricular study as the core and the primary task in college. "Having spent four years on this major, I've grasped basic concepts and framework of the field."

- *Acquiring a General Education*

Exposure to knowledge outside one's disciplinary field is a desired learning outcome for many participants since high school, but college experiences do not always live up to expectation. Institutional offerings in general education are constrained on the one hand, and on the other hand students are limited in their capability to balance the major program of studies and other curricular options.

> I had hoped I could take courses in two or even three fields in college, and take courses that interest me, just like my high school teacher told us. But the courses in my own major program have kept me busy, and I didn't have my own time for so-called general education [sigh]. (Liu, female, safety engineering major, university E, personal communication, October 20, 2010)

General education courses at another university, though below Huang's expectation in general, helped her approach her career and life interest:

> Not many courses were offered on what I wanted to learn. It seemed that general education course teachers didn't take them seriously [laugh]. They were often scheduled at night, and instructors rushed through lectures before a final. I didn't find them very helpful. I like cooking and sometimes think about it seriously as my career path [laugh], but there's no course offered on that aspect. But I took two courses on nutrition science, and I got certified as a dietitian. (Huang, female, logistics major, university D, personal communication, December 24, 2010)

- *Acquiring and Developing Hobbies*

Unlike acquiring disciplinary knowledge or a general education that was given serious consideration before college, developing hobbies was more of serendipity rather than planned. Guan cultivated many recreational interests in college:

> I learned skating and volleyball, took arts elective courses like embossment and calligraphy, and taught myself a little Korean and French. I also joined in a club and learned Cantonese opera, it's a local culture of where I belong to. I also took up photography. (Guan, female, marketing major, university D, personal communication, December 25, 2010)

- *Acquiring Knowledge about Real-World Life Outside the College*

Renshi shehui, or getting to know society, is a recurring term in the conversations. *Shehui*, or society, in everyday language in China, has one of its meanings of real-life scenarios opposite to the ivory tower-like school life. Society and school are two worlds separated by the spatial borderline of a physical campus and the temporal boundary of graduation. Developing an understanding of the world outside university was explicitly and eagerly desired for, and it was made possible by *tashang shehui*, or stepping into society. When asked what it meant to him, Chang responded that "the moment you leave university is when you step into society." However, with inadequate knowledge about the real world, Chang, instead of stepping into society, wanted to stay in school longer:

> I've minimum experience in society. I simply study in college [laugh]. I'm not ready yet for stepping into society. You've got to know about it before you do it. I devoted all my time in college to study preparing for graduate school entrance exams, as I feel I need to continue my schooling. In addition to a higher degree and a better job, I can see and try a lot in a master program, a doctoral program, and even a postdoctoral program, to compensate for what I haven't experienced as an undergraduate. I've got a long time in school to prepare myself. I hope I can learn more about the real world during my graduate education before stepping onto society. (Chang, male, material engineering major, university B, personal communication, October 29, 2010)

One of the goals of higher education is to prepare young adults for a real-world life outside the college. Having failed on this aspect at the undergraduate level, Chang anticipated hanging on in college for the ultimate goal of "leaving school and stepping into society," even though he was not interested in a research career.

Chang was an extreme case of not achieving what he and many others agreed as an important outcome of college. In contrast, Zhang recalled with excitement his first experience getting "into society" by serving at a banquet:

> I was extremely tired after running around that day, but it was the starting point of my stepping out of campus and into society. That made me feel like: Ah, I wasn't that kind of person incompatible with the real world and I was able to integrate. I'm not that kind of [laugh] student, who walks out of college but gets lost in the real world, looked down upon as a dummy that totally wasted his schooling! (Zhang, male, safety engineering major, university A, personal communication, November 8, 2010)

Skills

This outcome domain includes learning on one's own, practical competence (e.g., obtaining information, time management), speaking in public, and reflective thinking (e.g., critical thinking, analytical thinking, developing multiple views, seeing others' views).

- *Learning on One's Own*

An enhanced capacity to learn on one's own, or *zixue*, is seen as an outcome from college attendance. Wu cited one of his college professors:

> [He told us] When he looked back at his college life, his largest gain was improvement in *zixue*. When it's my turn to look back at my college life, I feel the same way. In high school, I was thinking about learning something, but I couldn't do it all by myself without a teacher's help. Now I'm learning Japanese from scratch on my own. Despite some difficulties, I'm able to reach the goals I set for myself step by step. I am capable of *zixue* out of college. (Wu, male, geographic information systems major, university D, personal communication, December 25, 2010)

The words of another senior echo what many participants said on this aspect:

> College is a platform for learning on your own. You can't just follow your teachers for straight four years. Teachers only play assisting roles to your learning, and college learning is a process of taking it on your own. As an engineering major, I've learned to use programs such as UG and CAD through books and online videos by myself. (Wang, male, mechanical engineering major, university A, personal communication, November 9, 2010)

- *Practical Competence*

Practical competence related to capacities to manage one's personal affairs. In high school, Chinese students focus on academic study and rely on parents and teachers to handle other issues in life. In college, however, those to whom the students used to cling retreat to the backstage. College students are excited about achieving independence, and are challenged in how to allocate time among various tasks, how to obtain and select information, and how to budget to make ends meet. Xiu reflected on her growth from getting lost on campus to dealing with the university system with ease:

> In the first weeks of college, I was so shocked that we had to run between buildings for different classes. We didn't even have a [homeroom] classroom like in high school. I took my class schedule with me and looked for buildings on campus. Now I can walk the campus even with my eyes closed [laugh]. And I know, if I want to do something, what's the right office to visit, who's the right people to talk to, and what's the place to get things done. It's such a growth for me. (Xiu, female, early childhood education major, university C, personal communication, November 26, 2010)

Students also transform from passive recipients to active information seekers in college. Hou recognized multiple sources and channels of information in college:

> Our library maintains many academic databases that we can use for free. I didn't know until a senior student told me in my third year. In high school, we only had one information channel: through teachers. But in college, there are lots of channels and I

> need to tap them on my own. There're lots of events on campus, published by different websites run by various units. I didn't start checking them until late in college, but I'm glad that I finally did it! (Hou, female, human resource major, university C, personal communication, November 24, 2010)

Participation in activities both in and outside of classrooms challenged students to balance schedules, to prioritize tasks, and to work with efficiency. Luo described her most important learning outcome in college as time management:

> I tell myself that I must grow on this aspect. I've many extra-curricular responsibilities, and much schoolwork. I remind myself to use every bit of my time and make the most out of it. I make a list every day on my calendar. When I start to idle, I take out the list, do things and check them off my list. It's so wrong to think I can procrastinate, as we often receive last-minute request for assignment due and I get extremely stressful. The time management skill will apply to my future work. (Luo, female, business major, university D, personal communication, December 23, 2010)

Living away from home in college did not necessarily mean financial independence for most Chinese college students, yet they learn to develop a budgeting mind:

> It's not easy to budget. In high school my parents gave me money once a week, now once a month. I was naive and got carried away as I got a big money every month! I couldn't help buying. But now, I don't. I think it over before a purchase. I used to work part-time at a campus newsstand, and earned my first paycheck in life. That's what my hard work exchanged for and I learned to take money seriously. (Lu, female, Chinese major, university C, personal communication, December 2, 2010)

- *Speaking in Public*

Expressing oneself with confidence and clarity is a college outcome desired by many. Public speaking is new for most college students in China, and the first attempt is often an intimidating yet memorable experience. Classroom practices and internship opportunities help students overcome fear and accumulate

confidence:

> You have to speak in public. It doesn't mean that you have to possess the talent, but you must have the guts. Some students are well-read and capable, but it's of no use if they can't demonstrate their abilities. If you blush talking to two persons, how can you stop trembling before a large audience? One professor asked us to give a five-minute speech in class for extra credits. I went to the front for the credits, but I forgot my speech before my classmates. I was very nervous, super nervous [laugh]. But now I'm different. Yesterday I led an outdoor training session with 70 or 80 people. I spoke with fluency and confidence. Very confident. This is such a growth in college. (Li, male, sport education major, university C, personal communication, November 28, 2010)

- *Reflective Thinking*

Reflective thinking captures higher-order thinking skills involving analyzing, evaluating, synthesizing, applying, and creating. Wen described her capacity for critical thinking increased in college:

> Many courses require us to identify a social problem, analyze the situations, and conduct empirical studies to support our critique. We often question the theories taught in class, and become used to critical thinking. When we question a teacher, we have to find alternative theories and materials to support our claims, and we debate with the teacher in class…. Our teachers are not afraid of being challenged…. One teacher brings his evidence to class and discusses with us. Sometimes he changes his views. He expects us to challenge him. (Wen, female, teacher education major, university C, personal communication, November 24, 2010)

Reflective thinking also embraces seeing multiple perspectives, and an examination of different viewpoints often precedes thinking critically. Lee benefited from his extracurricular engagement to develop his own thinking:

> The debate club taught me to consider an issue in a dialectic way. Now in everyday life, I hear and see what happens and my first reaction is to argue with myself and to examine the issue from multiple angles. For example, Fan Bingbing[1] defended in public for a

[1] A Chinese actress.

> third person involved in an affair, and she was criticized by netizens. Before, I would be one of them, as I would've followed majority. But now I have my own way of thinking, thinking about marriage as a social contract, its relation to romantic love, individual change across age stages. (Lee, male, computer science major, university D, personal communication, December 21, 2010)

A student teacher talked about the challenge of developing her own lesson plans and the necessity for innovation in this process:

> It's very hard to form our own ideas. Teachers require us to develop and implement our own stuff in classroom teaching. When we fail to do so, he said it's OK to borrow others, but most important of all, "you have to be creative." I reviewed others' lesson plans, but adapted the elements to my own class. I developed something new and practiced to see whether it's effective. (Xiu, female, early childhood education major, university C, personal communication, November 26, 2010)

Intrapersonal Awareness

This domain included outcome categories relating to one's awareness of self and identity. Exploring "who I am," "what type of person I am," "what I like and value," and "what I am good at and want to do" is a never-ending developmental task in a life-long journey. Five learning categories comprise this domain: understanding oneself, developing qualities and personalities, developing sense of responsibility, developing a personal code of values and ethics, and appreciating beauty.

- *Understanding Oneself*

The statement of "I want to understand myself" permeated the interviews. The young adults' desire and eagerness for understanding themselves was extensively expressed throughout the conversations. Students relied on external sources to create and modify their definitions of who they were. For example, personality tests and others' opinions were sought after to discover and affirm what a person she/he was and what a career path she/he should follow accordingly. Parents, teachers, and close friends were cited as people who understood "who I am"

better than the self. Unlike those who turned to external sources to look into themselves, Yang achieved a better understanding of her purpose by discovering what she did and did not enjoy in college:

> College helps me understand myself. Before college, I spent much time on schoolwork but didn't have time to see myself, what I am good at and what kind of person I am. At college, I find out I'm outgoing and flexible. I don't like repetitive work within a box, and prefer something less rigid. I'm a people person. I don't really want to be big in academic research. I'm not that into academic study (laugh). I realize that's not my potential, and I should develop what I'm good at. (Yang, female, early childhood education major, university D, personal communication, December 24, 2010)

Examining past selves contributes to an understanding of the present self. Students were being pushed to re-examine what they wanted to do after graduation, in comparison with what they wanted in the past:

> I've always admired scholars. I had an outstanding performance in high school; I thought I wanted to be that type of person, I wanted a graduate education, I wanted to be a scholar, I wanted to pursue this career path. But I changed my mind in college. I need to step out of college and work in the world. I want to apply what I've learned into practice. (Wei, female, safety engineering major, university E, personal communication, October 22, 2010)

Similarly, looking ahead into the future helped participants examine what kind of life they wanted to live after college. Young's reflection on career choices between a big city and the less developed West conveys this theme:

> I can't imagine myself as one of the busy ants in this big city. IT professionals work from 9 to 10, on Saturdays, and Sundays at times. There's no choice. That's not what I want for a life. I don't feel in it what I really value in my life. I'm thinking about going west, to see with my own eyes before making my own decision. (Young, male, computer science major, university D, personal communication, December 23, 2010)

A craving for self-understanding was enhanced as participants increased self-awareness, and it was integrated into future career plans. Wong explained

that one of his drives for going to Beijing for graduate study was to understand himself, yet with assistance from an external other:

> I want to receive graduate education in a more dynamic environment. It's not simply for studying content knowledge, but for advancing understanding of myself as a human being in depth.… I want to find a professional counselor there, and talk about myself. (Wong, male, aerospace engineering major, university A, personal communication, November 8, 2010)

- *Developing Qualities and Personalities*

Most participants believed that qualities and personalities were capable of evolving in college. Persistence, self-discipline, concentration, assertiveness, patience, tolerance, and self-confidence were among the qualities participants hoped to develop in college. Being optimistic, extroverted, and lighthearted were among the personality traits they desired to grow into. Mou criticized her lack of persistence in face of obstacles and barriers, and described her progress in college:

> At some moment I feel content on the middle stairs of a pyramid [laugh], as it's painful to climb upward. But at other moments I ask myself, a phoenix rises from ashes so why can't I? It's only 100 meters ahead before you cross the English Channel, but I give up just at that point. I regret it, as I can persevere at that critical point. I look back and ask myself: Why can't I? But very often, I still [give up] under similar circumstances. This is my biggest problem. I give up at the critical moment when I'm almost there. But I am gradually changing. I used to stop 100 steps away from the destination, next time at 50 steps, and I hope next time 25 steps. I'm moving forward every time. I won't demand myself to reach the top of the pyramid in my first attempt. I may keep failing before I make it one day, I believe. (Mou, female, Chinese literature major, university E, personal communication, October 20, 2010)

Another participant Mo stressed her greatest achievement in college was changing from a timid girl to an extroverted person:

> In my sophomore year, I felt like I woke up. Since then I've become more outgoing. I've

> changed a lot. Before, my parents had complained that I never said hello to elders and didn't say a single word at home. Now I can even play a joke with them, even with my *dabo*[2]. (Mo, female, chemical engineering major, university E, personal communication, October 18, 2010)

After reading the interview transcript, Mo emailed back emphasizing this change:

> As I became more outgoing, I kind of forgot the time when I was quiet and dull, and I rarely recalled what had made me change in college. I should remember those people and things in college that helped me become outgoing, and I truly appreciate, from the bottom of my heart, those who have helped me change. (Mo, female, chemical engineering major, university E, personal communication, March 12, 2011)

- *Developing Sense of Responsibility*

Young adults have a growing awareness of responsibilities to their families, to their work, and to their communities in college. Mourning the death of a family member or a friend's parent, being concerned about illnesses of grandparents, regretting an argument with parents over the phone, and even noticing grey hair of parents on a visit back home brought students to the awareness of their interdependence with families. The emotional bond incurs a sense of responsibility to one's family and commitment to hometown development:

> Our hometown grows peanuts, but all we sell are raw products, not processed peanuts, and our village is very poor. I talked with my brother about starting a peanut processing factory in our village. The villagers don't have to migrate elsewhere working for others. I talked with one of my college teachers, and he encouraged me to pursue this idea and I am now applying for a graduate program in food science. I hope to have a knowledge base for this startup. (Ren, male, mathematics major, university B, personal communication, October 27, 2010)

Students learn to claim ownership of their own work in college, though this learning does not necessarily happen within college. Wu compared his class

[2] The oldest brother of one's father.

assignment to a workplace assignment which called for a stronger sense of responsibility:

> [At internship] it's not OK if we turn in assignments as we used to in class. If we don't do a good job, that's really a problem, because it's my work. Holding responsibility is essential. At school, no matter if I study or not, I don't need to show that level of accountability. My responsibility in class is to submit the work, either completed by myself or copied from others. However, at work it's no longer true that the boss has to check on our assignment as college teachers. My work is presented to clients who will put it to into real use! Only when clients are satisfied do we get a passing grade. That means a much greater responsibility. (Wu, male, geographic information systems major, university D, personal communication, December 25, 2010)

- *Developing a Personal Code of Values and Ethics*

College students show that they are on their way to developing a personal code of values and ethics. Despite the varied pace of this process and distinct ways of making value and moral judgment, these young adults are increasingly aware of the importance of establishing principles they believe in and act upon. Innermost struggles experienced by participants that involve values and ethical judgment stem from the discrepancy between what they believe and what they do, as represented in Wong:

> I hope I can keep growing to be a *shanliang* [good and honest] person. Do I sound somewhat fake when I say *shanliang*? But it is truly what I think. It doesn't mean that I wasn't *shanliang*, but it means that if I come across some situation in the future I can see it with a right attitude and then handle it in a *shanliang* way. (Wong, male, aerospace engineering major, university A, personal communication, November 8, 2010)

To illustrate what *shanliang* meant to him, Wong elaborated on two incidents in which his friend was bullied by the class council president. He regretted not standing up to assert what he believed as right:

> I knew what the problem was but I didn't solve it. Even if I wasn't able to solve it, I could've done something to address it, to protect my friend. It's tantamount to my

> assistance to the evil that oppresses the good. I wasn't doing fair to my friend. Hence I hope I can grow more mature and more *shanliang* from the innermost, to handle such situation, to protect me and to protect the *shanliang* around me. (Wong, male, aerospace engineering major, university A, personal communication, November 8, 2010)

- *Appreciating Beauty*

Developing an appreciation for the esthetic qualities of life and the natural world was seen among participants, especially evident among participants with arts and humanities backgrounds. Several female fine arts and music majors reported visiting exhibits and attending concerts that advanced their aesthetic sensibilities, and they seemed more attentive to clothing and appearance showing up for interviews. For Xie, a male student in horticulture, his appreciation for beauty is reflected in his care of the surrounding environment. When talking about his career plan in horticulture, Xie looked around at the plants on the table and in room corners with love and passion. Among other participants, a couple of students mentioned their expectation of growing aesthetic ability in college but they were disappointed at their achievement on this aspect. Zhang, the student who used the metaphor of an isosceles triangle to describe his desired knowledge structure obtained in college, explained why he wanted to take some general education courses on music:

> I took one course in Music Appreciation and another in Cinema Appreciation. There were 200 students in Music Appreciation, and apparently the teacher couldn't cater for everyone's need. He talked about classical, modern and pop music. I can't fully appreciate Renaissance music. I like pop music, and I always want to dig deeper underneath a song, to understand more than saying something like "it sounds great! I like it," and to advance my appreciation of music. (Zhang, male, safety engineering major, university A, personal communication, November 8, 2010)

Interpersonal Competence

Awareness of self and identity cannot be separated from making sense of our relationships with external others. Learning to be with others is essential for identity formation and integration into the world. The outcome categories in this

domain include expanding social networks, addressing personal needs, developing teamwork and leadership, solving complex real-world problems, developing intimacy, and understanding others. Though the quotes are cited to illustrate these categories in the interpersonal domain, we can still read between the lines how the students become increasingly aware of who they are.

- *Expanding Social Network*

One of the benefits of college attendance is expanding social network, or in students' own words, "getting to know more people." *Guanxi* [connection] and *wangluo* [web] were two phrases that described the pragmatic function of social network. For Ming, an expanded social network was equivalent to resources:

> Compared to those who don't go to college, we have a larger network. An expanded social network helps build your career in the future.… I'm now using my network to find myself a good job.… My college network will play an important role in my future career and wealth. If I want to do a construction project, I've got a college friend with a family business in cement, another one in ferroconcrete industry. My social network sprawls into every field. (Ming, male, civil engineering major, university B, personal communication, October 28, 2010)

Activities outside of class provide platforms for students to get connected:

> In high school, my circle is constrained with only a few friends in my class. I'd never planned to expand my circle in college, but it happened naturally since I joined the Linux Club and later became the Club President. Through the club, I got to know many people outside of my class, in my cohort, and from other schools. It doesn't mean that we are "friends," but we loosely stay connected and my network is larger than many others. (Jiang, male, computer science major, university E, personal communication, October 21, 2010)

- *Addressing Needs*

Communicating one's needs, asking for help, and declining requests are among the learning that students acquire through interpersonal interactions. Ren learned

to seek help in college, which he had never attempted in the past:

> I'd rarely asked for help since primary school, neither in schoolwork nor in life. I tried my best to solve problems all by myself. But it's not good when I go to that extreme. A few of us are working together preparing for the graduate school entrance exam. When I'm struggling with a difficult problem, I ask them and they share with me not only their solutions but also many tips. This kind of learning is helpful and effective. Ask others, as they may possess unique ideas, and you will benefit, get enlightened and promoted. I really like this change that happens to me in college. (Ren, male, mathematics major, university B, personal communication, October 27, 2010)

On the other side of the coin, young adults begin to feel comfortable about saying "no" to others' requests and learning to say it in an honest way:

> I used to say yes to whatever request in high school. Even it was beyond my ability, I would promise to accept it in the first place. Since I entered college, I've seen someone who dared say no to something they don't like or they can't accomplish. It's very different from what I did. This approach works well for me! Sometimes you should say "no" in a frank and direct manner, otherwise situations might turn awkward. (Zhou, male, computer science major, university A, personal communication, November 9, 2010)

- *Teamwork and Leadership*

Solving a problem independently is not uncommon in elementary and secondary education in China, because students are expected to complete their schoolwork individually to succeed in subject matter examinations. Therefore, for most Chinese college students, teamwork is a fresh experience during which they develop collaborative and leadership skills. Teamwork in winning a case competition in college made Ren reflect on his understanding of collaboration:

> Effective collaboration is what's highly valued by employers. I got this idea from a career plan course, from some books I read in college, and this lived experience [of the case competition]. Wherever you go after college, graduate school, start-up or industry, individual effort is inadequate. It's only when you assemble the forces from those who share a common goal that you can succeed. (Ren, male, mathematics major, university B,

personal communication, October 27, 2010)

Students taking leadership positions in extracurricular activities define leadership in diverse ways. For some students, leadership refers to ways of talking, such as eloquence and persuasiveness. For others, leadership refers to charisma that drew everyone toward "a magnet" and capability that transmitted an individual idea to the group. For Luo, her resistance to "what a leader should be" as told by others and her exploration of "what she wanted to be as a leader" are intertwined with her self-identification:

> I was elected as vice chair of the board, some senior fellows called to congratulate, and advised that "You have to be aggressive, you have to speak loud your minds, you have to get used to feeling lonely at a high place, you have to keep distance with freshmen and establish authority." But I know that I'm not that type of person, not someone with that attitude, and I gradually figured out I am an implementer and a doer, and a decision maker implied by my leadership status on the board comes second. I didn't feel bad about it at all, as a team needs such a leader to function and I fit in. (Luo, female, business major, university D, personal communication, December 23, 2010)

Solving Complex Real-World Problems

Real-world problems, mostly involving people relations, bring growing pains that college students have to experience and reflect upon. Mou, recalled a conflict she encountered as Vice President of the Literary Society.

> We applied to use a campus square for an important event, and the School of Art applied later than us. I didn't find it out until the night before when they were moving paintings and sculptures for their exhibit. I was in panic. I argued with the person in charge and I was confronted by a teacher in the School of Art. We applied first, but he argued that a school was of higher status than a student group and should get the priority. He was talking mean to us and my hands were shivering all the time. I yielded and was desperately looking for another space. It was very painful. (Mou, female, Chinese literature major, university E, personal communication, October 20, 2010)

She continued to reflect on how she dealt with authority:

> I was too quick to give up. I saw they were already moving in and hence I'd better not fight. I first confronted a student leader at the School, but he soon brought in the teacher. Then I was seized with a panic. I'm timid before those with more authority, I feel inferior. I don't understand why I was scared of the teacher, he was not over me, nor could he hurt me anyway. This problem was solved fortunately, but I need to speak up with more confidence and calm under similar circumstances. (Mou, female, Chinese literature major, university E, personal communication, October 20, 2010)

- *Developing Intimacy*

High school dating in the Chinese mainland is generally discouraged and even prohibited, because teachers and parents regard dating as distracting to students who must focus on academic study. Four interviewees expressed that one of their college expectations was *zhao duixiang*, or finding a romantic partner. When asked about his greatest achievement in college, Zhou responded with a smile:

> The girlfriend I'm now dating…. I hadn't dated in high school. I didn't know how to think about others, how to think from the perspective of the opposite gender, what women think of men and relationships, how to get in contact with them and get along with them. I feel she and I get along very well. Sometimes we are both unhappy, but the next morning we tell each other why we feel so. I once told her frankly, that you are my first girlfriend and I am inexperienced in romantic relationships; if I am thoughtless, please tell me. (Zhou, male, computer science major, university A, personal communication, November 9, 2010)

- *Understanding Others*

Interaction with eternal others, no matter whether talking with strangers or working with colleagues, provides opportunities for students to see how others live their lives and learn how others think of their lives. Learning about others helps students develop understandings of those around them, in different relations with them, and in various occupations. Making sense of others involves reflection on one's ways of understanding others and impacts on the formation of one's identity. Xie shared his changing attitude toward a friend, and made constant claims during this process as to "what a person I was and I am":

> I used to judge someone from a singular and subjective perspective. I once had thought that someone was so stingy that it's not worthwhile making friends with him. A friend of mine since high school is the youngest of three sons going to college at the same time. He's quite stingy when it comes to money. But later I've learned a lot from him. He actually wasn't mean, but penny-wise because of his family. I gave it more thought: he was indeed a good guy with merits. He understands how to handle finance, and he doesn't squander like us from well-off families. He spends 20–30 yuan[3] on shoes that look no good, and orders cheapest when we hang out. Later in my sophomore year, I came to realize that he was truly a good guy. If I were him, I would be even more frugal thinking of my family. (Xie, male, horticultural science major, university E, personal communication, October 21, 2010)

Seeing how people made their living at work helps students understand the occupations they might enter in the future, and grow appreciation and empathy for workers. Liu described her senior practicum at a manganese factory:

> The workers barely wore protective attire. For example, those who were working at the furnace—the temperature was over 1,000 °C—wore short-sleeve, and didn't even wear a mask. Standing by the furnace for only seconds, I was suffocated. I don't know how to describe, and I don't know how they survive the heat. They told us that the heavy attire made them cumbersome and hot, it's such a burden. Alas. It was true, as I try the attire myself. It was not easy for them. (Liu, female, safety engineering major, university E, personal communication, October 20, 2010)

Discussion

Cross-Cultural Comparison

The taxonomy emerging from voices of college students is the first of its kind to be carried out in the Chinese higher education context. For the most part, the outcome domains are similar to those developed by U.S. scholars to define and categorize college outcomes (King et al., 2007; Kuh, 1993; Pascarella & Terenzini, 2005). Compared with the categories used by Astin's (1973) taxonomy of college outcomes and widely used by scholars such as Pascarella and

[3] About four dollars.

Terenzini (2005), except for those outcomes that cannot be determined until after graduation (e.g., career and economic returns and quality of life), outcome categories in this study cover all the dimensions: *cognitive-psychological* (for example, subject matter knowledge, critical thinking), *affective-psychological* (attitudes, values, personality orientations), and *affective-behavioral* (leadership, choice of a major, career choice, use of leisure time, and so on). The outcome domains revealed in this study also overlap with the three groups of learning outcomes advocated by AACU (2005): knowledge of human culture and the natural world, intellectual and practical skills, and individual and social responsibility.

Despite the similarity, differences exist between learning outcomes reported by Chinese college students and those in the West. The first and the most evident difference is the lack of student discourse regarding intercultural competence, which is an emphasized learning outcome in both U.S. and European higher education (Aguilar, 2009; Deardorff, 2006). Diversity was occasionally referred to by interview participants in this study, but it was limited to differences in dialect, diet, and ways of thinking associated with geographical regions or simply differences between the South and the North. Ethnic identity or difference was never brought up in the conversations, even at university E in an ethnic minority autonomous region where non-*Han* ethnic groups comprised nearly 40% of the population.

The second difference is the absence of reporting among Chinese college students of quantitative literacy as a learning outcome, an urgent challenge in U.S. higher education (Steen, 2004). Nor did the study find computer or information literacy as a learning outcome. In fact, in the survey analysis, the only item found unloaded on any factor was "using computing and information technology." Nor did interview participants report mastery of quantitative or computer skills as a distinct learning outcome. It is possible that Chinese college students regard quantitative and computer literacy as default skills even before entering college. It is also possible that learning experiences in this aspect did not impose as much challenge as in other aspects, and achievement in this category did not stimulate as much growth and change as others.

Learning Is an Integrated Whole

Despite the taxonomy, it is noteworthy to point out that a student develops not in

discrete domains or categories, but rather as an integrated whole. For example, leadership skill development is associated with one's understanding of self; desire of acquiring disciplinary knowledge is inspired by one's social responsibility; and achievement of a general education comes together with cultivation of hobbies and career preferences. Student growth along any dimension is often highly related to, and perhaps even dependent on, growth along other dimensions (Pascarella & Terenzini, 2005, p. 7). Student learning outcomes are viewed as interdependent, mutually shaping each another, and part of a larger developmental process taking within the individual (King et al., 2007). The integrated, holistic approach to student learning also applies in this study, and college students do not develop discretely within any domain or category. Yet, to make sense of the vast evidence that tells us in what ways students change in college, it is necessary to make some reasonable taxonomy or categorization.

Learning Happens in Diverse Settings

As the interview data revealed, student learning and development takes place in all settings, both in and outside class, and is more as a result of out-of-class experiences. Interview quotes cited in this paper illustrate that, student engagement in co-curricular activities (e.g., undergraduate research with faculty, informal study groups), extra-curricular activities (e.g., student clubs and associations), internship and part-time jobs, dormitory life, family and dating relationships, have made substantial contributions to student learning and development. Classroom teaching and learning helped students acquire disciplinary knowledge and a general education, and foster students' reflective thinking and teamwork skills, while out-of-class experiences affect student learning in almost all the domains. Development in one outcome category does not occur in one or another vacuum setting, but requires integrating and reflecting on experiences across the contexts. For example, one participant learned public speaking through practicing in class discussions, observing an eloquent class council leader, reading Dale Carnegie series, and working as an intern. Similarly, students brought in class requirement when reflecting on internship work standard, discussed with parents about frustration in peer relationships, and expanded library search skills to seeking all kinds of information. These settings—roommates, friendship groups, workplaces, families, and faculty relationships—are the immediate environment, or microsystems the

developing persons are engaged in (Bronfenbrenner, 1993; Renn & Arnold, 2003). The effect of one microsystem can be added or subtracted from the effects in other microsystems, and individuals are exposed to diverse settings in college and develop across the microsystems.

Conclusion

This study provides a contemporary view of the changes Chinese students attribute to college experiences. Derived from student survey responses and interview data, 19 categories of learning outcomes in four domains are identified. This classification of outcomes does not intend to deny student learning as an integrated whole. Rather, it provides a systematic approach for educational researchers and practitioners to make sense of student learning in four domains from a range of college experiences in different settings, and to understand how Chinese college student learning is similar to and different from that in the literature mostly generated in the West. Starting from Western frameworks on learning outcomes, this study primarily relies on voices from Chinese college students to generate a taxonomy which is not confined by Western literature but rather is of Chinese origin. Yet Chinese origin is still too general a concept and more empirical work needs to be done to elaborate and adjust the taxonomy, as well as to apply the taxonomy in classroom instruction and student development. Student learning outcomes cannot be understood separately from college experiences and developmental processes, as students put "what they learn" in the context of "when, where, and with whom they learn" and reflect on "how they have changed." These are important questions to be answered in future research on Chinese college students.

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