

RESEARCH CULTURE AND GRADUATE EDUCATION: DYNAMIC INTERACTIONS FROM INTERNATIONAL STUDENTS' PERSPECTIVES

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Abstract

In light of increased globalization in graduate education, examining cultures of research in various countries and their impacts on returnee professors and researchers is an important issue. This study attempts to clarify the dynamic processes that occur in international education, examining interactions among research culture, graduate education, and micro-level individual experiences of international students. Specifically, the study examines how research cultures in Japan, Germany, and other countries have influenced long-term teaching and research experiences of Indonesian international graduate students. First, a brief review of studies on research culture and science is presented, followed by how Japanese graduate education has developed. In brief, the Japanese research culture was community-based, whereas the German system was individual based. When some returnee Indonesian professors attempted to implement the collaborative Japanese *koza* and *kenkyushitsu* community systems that include a faculty chair, associate professors, and students at various levels who all work together, the student culture and contexts in Indonesia influenced in their implementation.

Keywords: International education, graduate education, research culture, Indonesia, Japan.

1 INTRODUCTION

This study examines how research cultures in graduate education have influenced long-term experiences of international students. There have been many studies on international students, including those in the 20th century (e.g., Altbach, Kelly, & Lulat, 1985) and more recently, those on higher education from global perspectives (e.g., Altbach & Peterson, 2007; Agarwal, Said, Sehoole, Sirozi, & de Wit, 2007), many addressing the issue of international student mobility from macro-level perspectives. However, rarely has a study focused on a specific issue at the macro level of international education in relation to individual students' micro-level perspectives.

The present author has been conducting longitudinal ethnographic research on Indonesian students studying in Japan (e.g., Arikawa, 1998). Through her recent follow-up research on these Indonesian students after their study abroad, it became apparent that the research culture experienced by the Indonesian students in Japan influenced their learning about research, especially those who returned to become university professors in Indonesia (e.g., Arikawa, 2012; Arikawa, 2014a; Arikawa, 2014b).

This study focuses on research cultures in which international graduate students learn to examine the impact of studying abroad on their comprehension and evaluation of university teaching and research. The study is structured as follows: First, it briefly reviews certain studies on research culture and science by Latour (e.g., Latour & Woolgar, 1986; Latour, 1987). Second, it briefly reviews how Japanese higher educational institutions have developed, especially with regard to their graduate education (e.g., Bartholomew, 1989; Clark, 1983; Clark, 1993; Clark, 1995; Coleman, 1999). Finally, it introduces some cases of Indonesians who studied in Japan, Germany, and other countries to examine how they interpret their graduate-student research experiences and how they practice teaching and research at their Indonesian universities.

Based on these discussions, this study attempts to clarify the dynamic processes that occur in international education, examining interactions among research culture, graduate education, and micro-level individual experiences of international students.

2. CULTURE OF RESEARCH

2.1 Studies on research cultures

Academics and researchers engage in research activities in many disciplines and fields. Clark (1983), in his study on higher educational organizations, discussed the historical and gradual development of knowledge and academic disciplines as specializations in different countries (pp. 28-45). For example, faculties of law, medicine, theology, and philosophy developed at German universities in the late 19th and 20th centuries, with a philosophy that came to cover a wide range of disciplines in later years (p. 37).

Research is usually conducted based on the assumption that those in similar fields share knowledge of how to conduct scientific research. Each field has certain methods and approaches for conducting research and publishing results and findings. In publications and presentations, researchers explain the methodologies they used to conduct their research; research methodologies vary widely, from quantitative to qualitative, from surveys to interviews, from experimental to observational, to just name a few.

In addition to content and findings in research, it is also important to clarify how research takes place, in other words, the cultures of research. Latour (e.g., Latour & Woolgar, 1986; Latour, 1987) has conducted extensive studies on scientific research. Among them are his anthropological works on laboratory science—how science is created. For example, as in his title *Science in Action: How to Follow Scientists and Engineers through Society* (1987), Latour explained the dynamic, active process that occurs in research. His work is based on extensive fieldwork, analyzing how research takes place, from experiments and references to discussions and publications, including dynamic interactions among these topics and the people concerned. Not only researchers conducting experiments but also various others are concerned in research, as are many aspects of the process itself, such as interpersonal and inter-institutional factors.

2.2 Studies on research in Japan

Historical studies on the development of research in Japan have included, Bartholomew (1989), who examined the development of science, focusing on how the science community formed during the Meiji period (pp. 49-88) in the late 19th century. Bartholomew analyzed the roots of science and scientists in relation to knowledge and science in the previous Edo era. In addition, he described how foreign teachers were brought to teach at Japanese universities. Furthermore, he described how Japanese government employees and professors were sent to Germany and other Western countries for further studies, to learn Western knowledge and science.

In recent years, studies on Japanese research cultures have included Coleman (1999), who described how science research is conducted, using his studies of Japan's scientific research institutes. He described both institutional and cultural aspects of people engaging in research. For instance, Coleman explained about *koza* (chair) "as the fundamental personnel and budgetary unit" (p. 19), the basis of research and teaching at Japanese research universities. He explains the full professor as "its apex authority," with other faculty members participating, for instance, an associate professor and one or two assistants (p. 19). In addition, each *koza* has students from upper-level undergraduates to graduates, who have entered the *koza* to "learn laboratory research skills and write graduation theses" (p. 19). Coleman also compares the *koza* system to U.S. universities' departmental system: The *koza* system is relatively hierarchical, whereas the department system is relatively horizontal and allows independence in research (pp. 20-26).

These past studies help explain the diversities in research cultures and the contexts in which research is conducted. Furthermore, researchers in some organizational structures belong to and engage in only certain research processes and steps.

What and who controls what occurs in research differs depending on the context and culture of research, including those who actually engage in research and others who are concerned with the research.

To become a researcher, a novice needs to learn how research is conducted and how things work in their field. Currently, one place to learn this is in graduate programs at higher education institutions. Graduate programs have established systems and conditions for graduate students to complete. For example, once graduate students are accepted into a program, they not only learn about research but also conduct research. After they have met the conditions and requirements, successfully obtained findings, and completed or published a thesis, they gain a degree. Thus, examining the research culture at higher education institutions is important.

3 DEVELOPMENT OF HIGHER EDUCATION IN JAPAN

3.1 Studies on the development of higher education and graduate education

Among many studies on the development of higher education, Clark (1983) analyzed the higher education system, by examining its historical development and comparing academic organizations in different countries. Clark (1983) described the different systems of organizational units, including chair and departmental organizations (pp. 46-49). He explained that the chair organization is very old and has “internal hierarchy” (p. 46). In German research universities, the chair system became the academic organizational model of the 19th and early 20th centuries, with a full professor having the most control over research and teaching (p. 47). Clark further explained the chair system’s influence on other countries, including Japan, whose chairs have come to include “several positions for assistants” (p. 48).

In addition, there have been comparative studies on research foundations and graduate education in the five countries of Germany, Britain, France, the United States, and Japan (Clark, 1993; Kawashima & Maruyama, 1999; Ushioji, 1999). Based on these studies, Clark (1995) overviewed each country’s characteristics of graduate education; he discussed how the “research-teaching-study nexus” (p.1) of the Humboldtian principle was related to and practiced at graduate education and research organizations in these countries.

3.2 Studies on graduate education in Japan

Clark (1995) described the characteristics of Japanese graduate education as “the applied university” (p. 185), in which research and research training has been taken over by industry. Clark explained that Japan had great variations in graduate programs and research, depending on the fields, from its strong engineering training closely linked to industry, to other fields such as humanities and social science (Clark, 1995; Kawashima & Maruyama, 1999). Clark discussed the constraints in graduate education, with stronger and active research activities outside universities in industry, explaining, “Late twentieth century Japan is a great experiment in the possibility of industry dominating the university in both research and research training” (Clark, 1995, p. 183).

Since the late 20th century and early 21st century, higher education and graduate education in Japan have been experiencing rapid changes and reforms, for instance, on organizational, financial, and personnel matters (e.g., Amano, 2006; Arimoto, 2008; Yamanoi, 2007). One recent major change, since 2004, has been the transformation of assigning former national universities a “corporate body” status; this brought further changes in financial and other situations of higher educational institutions. For example, Yamanoi (2007) described Japanese government-led attempts, since the late 1980s, to increase mobility among academics and researchers who hold higher degrees in academic and non-academic markets; included in this description was how these attempts have influenced Japanese higher education institutions in recent years (pp. 289-316). Among the influences was an increase in the number of graduate programs that in turn increased the number of graduate students. However, academic and non-academic markets have not grown during this period, but contract-based academic positions have (Yamanoi, pp. 310–312).

These past studies show the dynamic changes that continue to occur in higher education and graduate education. Having reviewed the development of graduate education at higher education institutions in Japan at the macro level, we will now examine the micro level of graduate education from the perspectives of individual students who studied abroad in engineering fields.

4. EXPERIENCES OF GRADUATE EDUCATION AND RESEARCH CULTURE IN ENGINEERING

4.1 Engineering culture of research for graduate students in Japan

As explained above (e.g., Clark, 1995; Coleman, 1999), Japanese graduate education at research universities follows the *koza* system. However, in practice, the *koza* is in a state of change; the professor holding the most power might be the same, but the number of other faculty positions is changing. For example, there might be one professor, one associate professor, and one contract-base assistant. And yet, the *koza* continues, as a number of students belong to the same *koza*—from the doctoral level, to the master level, to the senior year of undergraduate programs. *Koza* is commonly called *kenkyushitsu* (research office) with the name of the professor in charge placed before *kenkyushitsu*.

The author’s past studies on Indonesian students in Japan (e.g., Arikawa, 1998) explained how *kenkyushitsu* culture worked as a “community of practice” (Lave & Wenger, 1991). A *kenkyushitsu* community comprises a

professor, other faculty members, and students. In such a community, relationships among students influence their lives greatly, including their research activities. For example, a research topic might be part of a research project whose funding was obtained by the full professor. Community members might work on the project with roles and responsibilities divided among them. A new student learns about conducting an experiment from senior students who have more experience both in research and in the community's equipment.

Students who belong to the *koza* community engage in various types of academic and non-academic activities. These activities include not only research matters but also other activities, such as eating lunch and dinner and having teatime, which are often a daily routine. In addition, when new members join the lab in a new academic year, there might be a welcoming party, and at the end of the academic year, a farewell party. Furthermore, there may also be other events and activities in which members are expected to participate. A student can spend several years in the lab, engaging in various types of activities with other members. Gradually, starting as a novice, a student learns about various types of *kenkyushitsu* community activities, both academic and non-academic. A novice might change status from a junior to a senior student, as the year passes and senior students graduate and junior students enter the community.

In sum, Japanese research culture for graduate students in engineering fields shows the importance of relationships, not only with the professor but also among fellow students belonging to the same research community.

4.2 Research methods of follow-up studies in Indonesia

For follow-up studies on Indonesian returnees in engineering fields, the author stayed approximately one to two weeks in Java, during 2011, 2012, and 2013. She conducted interviews with Indonesians who had completed graduate programs to earn doctoral degrees. In addition to interviews of informants in 2011, with whom the author has shared a rapport since her early 1990s fieldwork in Japan, the author conducted interviews in 2012 and 2013 with other Indonesians who earned doctoral degrees in countries other than Japan. The numbers of informants were 6 university faculty members in 2011, 18 government employees in 2012, and 16 university faculty members in 2013.

Each interview, lasting an average of one hour, was conducted in either Indonesian or Japanese. Interviews focused on the informants' study-abroad experiences, especially those in their academic lives, including relationships with their supervising professors and fellow students and, especially for those who studied in Japan, in the *kenkyushitsu* community. In addition, interviews included questions on such matters as, after their return, how they interpreted and valued their experiences. Questions were also included on how their learning abroad influenced their activities after returning to Indonesia.

In brief, the research focused on academic experiences of graduate students abroad and possible influences on teaching and research activities by university faculty after returning from abroad, introducing cases of Indonesians who studied in Japan, Germany, and other countries.

4.3 Stories of informants who studied in Japan

Informant A studied at a graduate school in Japan from 2006 to 2009. After completing undergraduate study in 1997, he had become an assistant at his university in Indonesia. Upon obtaining his doctoral degree in Japan, he resumed his position in Indonesia.

Informant A studied Japanese language prior to his departure for Japan and during his first six months as a research student at a Japanese university. In addition to discussions with his supervising professor, he had support from junior students in conducting research and experiments. There were four students in their senior year of the undergraduate program, eight master level students, and four doctoral students, including Informant A. Every week, every member in the lab had to participate in a seminar.

Informant A remembered his lab environment as comfortable. The lab members joined one another every day for lunch, teatime, and dinner; there were parties as well. Eating lunch and having tea with his colleagues aided him greatly in his research. If he had a problem with his research, even talking about it indirectly with his colleagues helped him get ideas for overcoming the problem or making a breakthrough.

Informant A said that upon his return to Indonesia, he was confident and more disciplined; he attempted to conduct research even though the Indonesian facility was inadequate. One of his teaching efforts was to involve students in the research. However, there was not enough space to use as a lab where students could work together.

Besides Informant A, other informants who had studied in Japan, came to value the collaborative learning of their graduate experiences in Japan. Among those who had been long returned from Japan, some created a system and culture of research similar to what they had experienced in Japan, where a group of students worked together, learning about research from each other. Some also attempted to establish a regular meeting session, where all students would regularly discuss research or journals in their fields.

4.4 Stories of informants who studied in Germany and other countries

After his undergraduate study in Indonesia, Informant B became a graduate student in Germany from 1990 to 1997, completing a master's and a doctoral degree. He studied the German language before departure and for six months after arrival in Germany. Discussions with his supervising professor were conducted in German and English.

Informant B met individually with his professor, who had an office in the same building, every week for approximately 30 minutes. Doctoral students were expected to be able to conduct research independently, so in principle, students were expected to report to their supervisors about their research projects. Making an appointment with the supervising professor was the student's responsibility.

As for conducting experiments, Informant B was given a manual that had to be studied. Technicians helped with the students' experiments, including B's. The supervising professor helped B with research theory, but technicians supported any technical matters.

Upon return to Indonesia, Informant B was engaged in teaching and management. He and his colleagues were working in technology transfer to industry, in cooperation with Germany and other countries.

Informant B and other informants who had studied in Germany and other countries experienced a different research culture. They had regular individual consultations with their supervising professors. As for experimental support, the technician system was used. Students did not work together in actual experiments or research. In sum, students basically conducted research individually—the supervising professor helping with theory and technicians with technical matters.

These informants engaged in discussions and interactions among students. For example, they had regular meetings and/or teatime during which professors and students in similar fields met for discussion.

On returning to Indonesia, Informant B and those who had studied in other countries did not talk about a research culture in which students worked together or helped one another. Students were supervised and advised individually.

5. DISCUSSION

On the one hand, Japanese higher education has been represented as following the German university system when it was first introduced in the late 19th century (e.g., Bartholomew, 1989; Clark, 1983). On the other hand, this study shows the German system to be organized and managed differently from the present *koza* system. Although the German chair system with a full professor having the most power might resemble the Japanese system, the German system is more individual- than community-based. The *koza* system has developed as a research unit that includes a professor, junior faculty members, and students at different levels—who learn together and help each other. Junior students assist senior students with their research and learn how to conduct research in the process. Once the senior students graduate, former juniors become senior to newcomers in the *kenkyushitsu* community.

Indonesian informants who undertook graduate education abroad learned a research culture, and on return, engaged in diverse research and teaching activities as faculty members in Indonesian universities. Among those who studied in Japan, some informants valued and tried to recreate the Japanese research culture, with a group of students working on or discussing research.

Importantly, however, the culture and context after the Indonesian informants' return from abroad influenced their practices. For those who studied in Japan, their current professional activities linked not only with learning in Japan, but with what and how the individual faculty could actually put into practice in their teaching and research. For example, if they wanted to create a *kenkyushitsu*-like environment in the Indonesian context, informants needed space where their students could get together and spend time on research and other activities.

Another influence from abroad concerned the practice of regular meetings among students. Since students in Indonesia were not used to working together on research, the informants themselves had to expend effort

to establish this practice. Training an emerging-senior student to advise novice-junior students was challenging for informants working with those unfamiliar with such a practice.

In addition, teaching and research was influenced by funding and research activities. For example, Indonesian students must usually pay for the lab equipment in their experiments. The returnees learned of the Japanese practice in which the professor obtains funding and has students take part in the research, without students paying for lab equipment. Some informants tried to obtain funding so that their students could participate in their research projects.

These are some influences that became apparent through analyses of the cases of Indonesian informants who studied abroad and practiced teaching and research after returning to Indonesia. This study clarified that, in addition to experiences of individual international students, it is important to be aware of the cultures and contexts of host and home countries that influence practice and activities after study abroad. Taking these factors into consideration, this study explained the dynamic process of learning in a research culture as graduate international students at the individual level, as closely linked to macro-level factors of graduate education and higher education institutions in international contexts.

6. CONCLUSION

This study examined the interaction between the fields of international students, cultures of research and higher education from the perspectives of international students as they go abroad, study at host institutions, and earn degrees. Examining research culture and higher education institutions has clarified how graduate education developed and how sociocultural contexts and other factors influence the learning experiences of individual graduate students.

Follow-up studies have clarified the impact on interpretations and values of Indonesian returnee graduate students when they have experienced a certain research culture; this impact is closely related to their actions and practices in teaching and research as university professors.

These impacts might have been relatively easy to identify because this study's informants have academic positions at higher education institutions. It will be interesting to explore the impacts of study abroad on those who have obtained positions at other institutions and have other types of careers.

7. ACKNOWLEDGEMENTS

This research was financially supported by the Grant-in-Aid for Scientific Research (B) (Grant No. 23402062), Japan Society for the Promotion of Science, and by the Grant-in-Aid for Challenging Exploratory Research (Grant No. 24653249), Japan Society for the Promotion of Science. The author would like to thank the informants for their cooperation in the research.

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