Validity of Outcome-oriented, Competency-based Education in the Age of Global Student Mobility: Implications from an EU-Japan comparative study on competencies expected of university graduates

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Abstract. Outcome-oriented, competency-based education has recently been discussed intensively in the higher education community. This education model, a product of more than a hundred years of theoretical dialogue and pedagogical implementation at different levels of schooling and training, is now recognized as effective for university education in the age of global student mobility. As outcome-oriented, competency-based education is oriented to provide clearly prescribed information on the profiles of credits and degrees universities offer, it is seen to enable objective-oriented and seamless learning across different institutions and regions. However, a recent survey in Japan and the EU revealed that there are significant regional differences in expectations regarding the competencies of university graduates. In particular, the expectations of Japanese employers are remarkably different from other stakeholders in both Japan and the EU. To the extent that outcome-oriented, competency-based education is developed through consultation with employers, its utilization requires careful implementation in a global setting.

Keywords: Outcome-oriented education/learning, competency-based education/learning, global student mobility, Tuning project, cross-regional comparative study, Japan and the EU

Introduction

There are increasing concerns about the amount and quality of competencies that university graduates have acquired by graduation. In competency-based education, students are expected to acquire concretely defined and prescribed competencies through a class or other learning unit that comprises a greater learning outcome constituting the accumulated sets of competencies. Academic credits and degrees are awarded based on the mastery of prescribed competencies when the expected learning outcomes are attained. The competency-based approach is thus often conflated with outcome-based

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education. Although these two approaches are not the same in their details, competency-based learning and teaching is oriented around the outcomes that need to be attained.

Since the early 2000s, both competency- and outcome-based education have been increasingly discussed for university education in major developed countries including Japan. This reflects the world-wide trend in the higher education community that features the rapid expansion of enrollment, diversification of student populations, shrinking governmental budgets, and increasing global competition, all of which call for the enhancement of the accountability of university education through increasing the visibility of learning contents and outcomes. Unique to outcome-oriented, competency-based education at the level of higher education is that, since higher education is the last schooling before students enter the workplace, the outcomes are set out by considering the needs of society and industry. Thus, the list of competencies to be acquired at college or university are usually prepared through a joint effort by academia and industry.

The Tuning Educational Structure in Europe (hereafter, "Tuning project") is an example of building a bridge between academics and employers in a way that enables better understanding of the knowledge and skills students will need to succeed in work and life. The project is also designed to facilitate mutual recognition and information sharing between universities in different countries, in terms of the contents and evaluation methods of disciplines, courses, and programs[1]. To that end, the Tuning project conducts surveys called "Tuning Pilot Studies" with academics, students, graduates, and employers (university stakeholders), asking them what competencies they expect university graduates to have. Hence, the list of competencies prescribed through the studies reflects the needs and wants of both academics and industry, as well as society. The core of this paper is a discussion of the comparative analysis results of the Tuning Pilot Study conducted in Europe and Japan, investigating the general competencies that university education is expected to develop. The same questionnaires were distributed in both regions among university education stakeholders including students, academics, graduates, and employers. Our intention was to discover differences/similarities in the recognition of important competencies between the two regions and among the different stakeholders in the respective regions.

The first part of the paper will be devoted to reviewing theories that have led to the current implementation of outcome-oriented, competency-based instruction and learning. Although the key concept in this paper is "outcome-oriented, competency-based" instruction and learning, the theories reviewed are not limited to the exact terms of "competency," "competence," or "outcome," but include various related concepts, including "mastery-based education," "performance-based education," the "standards-based approach," and "proficiency-based education." These are not exactly the same but

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[1] The Tuning Education Structure in Europe was started in 2000 with the intention to redesign and enhance university education along with the Bologna Process to develop the European Higher Education Area. The official website of the project is as follows: http://www.unideusto.org/tuningeu/

For a conceptual and practical discussion on how competencies as well as learning outcomes are located in the Tuning project, see Wagenaar (2014).

are consistent in the "key element" of competency-based education, which is "target- and objective-oriented" with a clear description of attainable learning outcomes, all of which appear to shape the current concept and implementation of competency-based education. The subsequent part of the paper will contain a comparative analysis of the Tuning Pilot Studies conducted in the EU and Japan. This section will include a description of the data, analytical method, and findings. The paper will conclude with a summary of the findings of both theoretical reviews and analyses of the Tuning Pilot Studies as well as the implications based on the findings.

The aim of this paper is to address and discuss the trend and issues of outcome-oriented, competency-based education in the age of global student mobility. It is neither intended to guide or lead to the management or implementation of an education model, nor is it intended to support instructional design or curriculum development. Rather, this paper re-examines the concepts and theories of competency-based education in order to carefully interpret the empirical results derived from cross-regional research conducted in the EU and Japan. By closely reviewing the historical development of the competence-based approach in learning, instruction, and training over the last century, this paper attempts to explore both the potential of and issues with the current development of competency-based education. Special attention will be paid to the meaning and role of the outcome-oriented, competency-based approach in a world where a growing number of higher education graduates work in multiple regions.

Review of theories and concepts: Historical development of outcome-oriented, competency-based education

Outcome-oriented, competency-based education, which has recently been intensively discussed in the higher education community, is a product of more than a hundred years of theoretical dialogue and pedagogical implementation at different levels of schooling and training. Literature on the historical development of competency-based education generally agrees that its origins date back to the early 1900s, when Edward L. Thorndike presented a type of behavioral psychology that uncovered the process of learning through a scientific approach (Thorndike, 1913, 1932; Thornike et al., 1927). Thorndike also introduced a quantitative approach with empirical evidence for performance testing and other educational and social problems, which came to be the theoretical foundation for competency-based instruction (Beatty, 1998; McCowan, 1998; Morcke et al., 2013).

It is noteworthy that John Dewey is also described as one of the background resources for competency-based learning. Jover and Fernández (2015), as well as Klingstedt (1972), agree that to the extent that competency-based education is performance-based; Dewey's emphasis on studying man's behaviors through a scientific approach (Dewey, 1938) built a foundation for competency-based education. Moreover, Dewey's pragmatic philosophy places education as a function of social well-being (Dewey, 1907), thereby underlining the experimental formulation consistent with

competency-based learning designed to respond to the requirements of the real world.

Although not in the field of education, it is well known that the methodology for competency-based education was made possible through the conceptual and practical discourse in the *Principles of Scientific Management* by Frederick W. Taylor (1911) (Curry & Docherty, 2017; Pinar et al., 1995). McCowan (1998) specifically remarks about Taylor's extensive contribution to competence-based training, noting, "[Taylor] originated the practice of task analysis and promoted the notion of clear job descriptions." He also quantified performance standards and the evaluation of workers based on job-related competencies related to measurable program outcomes (p.17).

After the World Wars, modern learning theorists began to more practically and precisely connect competence-based learning to teaching practices in formal schools. Well-noted thinker Ralph W. Tyler wrote *Basic Principles of Curriculum and Instruction* (1949), which became the basis for what was later called the "Tyler Rationale." The Tyler Rationale addresses four steps to be performed for curriculum development and instructional evaluation, consisting of: 1) defining learning objectives, 2) selecting learning experiences to attain the objectives, 3) organizing the learning experiences for effective instruction, and 4) evaluation of the effectiveness of the learning experiences. These exercises and their sequence are well aligned with outcome-oriented, competency-based instruction and learning. He also asserted that learning should take place through the active participation of students, rather than being defined by what instructors teach, noting that "it is what *he does* that he learns, not what the teacher does" (p.63). The student-centered approach to learning was indeed the key element of Tyler's formulation, leading to a major shift in curriculum development from a content-driven to a student-centered model (Gervais, 2016). In his six lectures at the Patten Lecture Series held in 1974 and 1975, Tyler covered a series of studies that elucidated the history of American education till the mid-1970s (Tyler, 1976). These lectures were centered around a greater focus on students' interests, dynamic curricula that should be constantly evaluated and revised, and visible and quantifiable learning objectives that should be linked to assessment systems. These principles came to be the fundamental concept behind competency-based learning (Le et al., 2014). The baton was then handed over to Benjamin Bloom at the University of Chicago.

In Chicago, Bloom worked with Tyler where and when he found that objectives in education and learning could and should be organized according to their cognitive complexity. His work resulted in *Taxonomy of Educational Objectives* (Bloom, 1956), in which he introduced a comprehensive system for the description and assessment of education outcomes through the classification of learning objectives. This was later advanced as the theory of "mastery learning" (Bloom, 1968). His work had a significant impact on thought and practice in the fields of philosophy of education, education psychology, pedagogy, and curriculum development (Eisner, 2000). Around the same time, Robert Mager (1962) delivered *Preparing Instructional Objectives*, widely known and used by American educators as a manual for writing instructional objectives. He also developed Criterion Referenced Instruction, a comprehensive set of methods for designing training programs linked to the skills

required in actual social settings (Mager, 1997). Mager's key argument was that clearly defined objectives and goals are indispensable in the evaluation of learning and education. This is obviously close to the current core concept of competency-based learning and assessment.

Along with these theoretical orientations, growing implementations of objectives-oriented education and training were taking place in the 1970s and 1980s, when mastery learning had its heyday in the U.S. (Guskey & Pigott, 1988). In the meantime, the 1980s and 1990s saw the beginning of the "standards movement," a reform effort that called for clear and measurable standards for all school students in the U.S., where students are measured against concrete standards and then curricula and assessments are aligned with the standards (Hamilton et al., 2008). The standards movement was not exactly on the same track regarding the current competency-based education, but what they have in common is their advocacy for an objectives- or goals-oriented system that aims at raising students' academic performance[2]. From the 1980s onward, the competency-based approach was well integrated into the political agenda. In 1989, under the George H. W. Bush administration, governors from all 50 states were involved in the adoption of national education goals for the year 2000. By 1998, almost every state in the U.S. had implemented academic standards in mathematics and reading. Meanwhile, in 1994, the Chugach School District in Alaska launched a performance-based learning system that has been described as the forerunner of today's competency education models (Le et al., 2014; Sturgis, 2016).

Wide implementation of outcome-oriented, competency-based education was observed indeed in almost all OECD countries since the 1990s. A powerful engine to support the global implementation was DeSeCo (Definition and Selection of Competencies: Theoretical and Conceptual Foundations) prepared by OECD between 1997 and 2003. Particularly in the EU, along with the Bologna process and the Tuning Educational Structure in Europe, outcome-oriented, competency-based education became a major vehicle for quality assurance and mobility enhancement in the development of the European Higher Education Area[3]. Researchers in Japan have also contributed to the study of competency-based and/or outcome-oriented learning and/or curricula. Matsushita's (2010) edited volume, for example, delivers a comprehensive discussion to explore "new key competencies" introduced in the 1990s focusing how the concept affects curriculum, learning and assessment in the Japanese education community. In the area of higher education, Kawashima (2009) and Fukahori (2015) demonstrate competency-based and outcome-oriented learning in the context of quality

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[2] The differences and similarities of competency- and standards-based education are discussed by various authors, including the State Department of Education at:
https://portal.ct.gov/SDE/Mastery-Based-Learning/Standards-vs-Competencies and quasi-public or non-profit education consulting associations such as reDesign at:
https://www.redesignu.org/what-difference-between-competencies-and-standards
It should also be noted that the standards-based education reform began in the United States with the publication of *A Nation at Risk* (U.S. National Commission on Excellence in Education, 1983).

[3] See González, Ryan & Wagenaar (2013) for the base argument for the evolvement. Other articles on competence-based learning and related theories and practices can be seen in the site of Tuning Journal for Higher Education at the following site: http://www.tuningjournal.org/

assurance for university education.

Despite the widespread adoption of outcome- and objective-oriented competency- and standard-based instruction, learning and assessment, these approaches developed in the twentieth century have faced significant obstacles. Some opposition is due to political concerns or fear of change, particularly in the phases of implementation (Spady, 1994)[4]; others come from conceptual and methodological critics of pedagogy, curriculum and learning. Ainsworth (1977) addressed three types of problem in a competency-base system: 1) the problem of specifying competencies; 2) the problem of deriving competencies; and 3) the problem of maintaining standards, i.e., the problem of debasing the influence of a competency-based system. Similar critiques were addressed by Horton (1979), who noted :1) the unlikeliness of academic professionals reaching an agreement about specific educational goals; 2) the difficulty of defining a curriculum for mastery; 3) the scarcity of diagnostic and assessment tools; 4) the lack of corrective and remedial instructional treatment; and 5) the lack of the teacher time, energy, and skills needed to apply the model effectively.

In the area of higher education in particular, Voorhees (2001) stated that issues with the competency-based model in higher education include: 1) practical concerns about measuring and reporting competency; 2) the critical connections between the skills employers seek and students' preparations for them; 3) the connections between distance education, accreditation, and competencies; and 4) the difficult procedure of setting appropriate passing standards for assessments. The consistent problem across other levels of education appears to be the difficulty in specifying, reporting, measuring, and assessing competencies. Setting and maintaining standards is also a common issue for all levels of education. In fact, the issue of setting and maintaining standards must be even more serious in higher education since students are more culturally and intellectually diverse. Also, accreditation becomes a critical issue for the higher education community if outcome- and competency-based assessment plays a part in quality assurance, particularly for different forms of education, including distance education. Lastly, the connections between the skills employers seek and students' preparations for them are, as discussed previously, an issue that higher education is particularly cautious about compared with other levels of education. Furthermore, students in higher education and graduates of higher education have become increasingly mobile. Since the competencies they are expected to have might differ from region to region, defining and assessing competencies in a global setting must be challenging.

The OECD took on this difficult task through the Assessment of Higher Education Learning Outcome (AHELO), a pilot project to measure student achievement in higher education cross-nationally[5]. Expectations related to the pilot were nontrivial and various contributions were

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[4] Chapter 6 of Spady (1994) addresses a controversy "outside of the education system" (p. 142) due to the opposition to outcome-based education falling into the three categories of activist opponents, vocal critics, and concerned individuals.

[5] For details on the project, see the following official site: https://www.oecd.org/site/ahelo/

reported (e.g., Damme, 2015; Ewell, 2012). The project, however, did not see full international implementation, as was initially planned. Indeed, there were more than a few criticisms from higher education experts about the concept and feasibility of AHELO (Altbach, 2015; Ashwin, 2015). Altbach (2015), for instance, remarked that "The pilot was deemed by most to be a failure," and that "It seems highly unlikely that a common benchmark can be obtained for comparing achievements in a range of quite different countries" (p.2).

Hence, the development of outcome-oriented, competency-based education involves complex issues that have not often been observed in lower-level education, including: 1) the fact that competency-based education is designed to respond to the needs of employers; and that 2) higher education has been increasingly globalized and students and graduates move cross-regionally, often without any pattern or rule (Adelman, 2016). Competencies valued highly by employers in one region might not be so in another region. Then, competency-based learning and assessment can even reduce the employability of students in the global market. This concern should be addressed as an emerging problem for competency-based learning in the age of global mobility; that is why it is the focus of inquiry in this paper.

EU-Japan comparative analysis of Tuning Pilot Studies

The empirical part of this paper is based on analysis of surveys conducted in both the EU and Japan. As explained briefly, the survey originated in Europe under a project called the "Tuning Educational Structure" in Europe (hereafter, "the Tuning project"). A Tuning Pilot Study is the first step in carrying out the process of the Tuning project and is designed to explore the general and area-specific competencies that university education is expected to develop in students. The survey is designed to learn what specific competencies are recognized as important by the stakeholders of higher education in that context. This is done by asking academics, students, graduates, and employers the same questions about the same list of competencies. The survey thus lets us know the expectations of the stakeholders in university education. The survey also enables us to compare differences/similarities in the recognition of important competencies among different stakeholders.

Since the Tuning Pilot Study has been conducted in different parts of the world, we can perform comparative analyses by using the results from different regions. Beneitone and Bartolomé (2014) for instance compare the results of Tuning Projects in Europe, Latin America, Africa and Russia, focusing on the issue of generic competences across different cultural contexts. The study shows differences in the recognition of important generic competences among regions and argues that the cultural context and the tradition of education systems must be closely considered in order to understand the importance of generic competences in different regional settings. Regional comparative studies are in turn effective to explore the strengths or uniqueness of university education in specific regions under investigation. If the recognition of important competences are reflected to

the academic discipline and the contents of curricula, the comparative studies enable us to attain comparative and competitive advantages for academic programs of specific institutions or regions[6].

Data

The Tuning project in Europe consisted of four phases taking place between 2000 and 2009. In Japan, what are called "Tuning Surveys" instead of "Tuning Pilot Studies" were conducted in 2014, 2015, and 2016. In both regions, questionnaires were distributed through universities to their students, faculty, graduates and employers who hire the graduates[7]. Table 1 shows the number of cases subject to the analysis in the EU and Japan. The Japanese data comprised of 4,053 cases and the European data comprised of 7,087 cases were merged and the resulting dataset of 11,140 effective cases was used for comparative analyses.

Table 1. Number of cases subject to analysis

	Academics	Students	Graduates	Employers	Total
Japan	586	2767	817	473	4643
EU	2041	1948	2219	879	7087

Table 2. Generic competencies (31 questions)

1. Ability for abstract thinking, analysis, and synthesis.	16. Ability to work in a team.
2. Ability to apply knowledge in practical situations.	17. Interpersonal and interaction skills.
3. Ability to plan and manage time.	18. Ability to motivate people and move toward common goals.
4. Knowledge and understanding of the subject area and understanding of the profession.	19. Ability to communicate with non-experts in one's field.
5. Ability to communicate both orally and through the written word in native language.	20. Appreciation and respect for diversity and multiculturality.
6. Ability to communicate in a second language.	21. Ability to work in an international context.
7. Skills in the use of information and communication technologies.	22. Ability to work autonomously.
8. Ability to undertake research at an appropriate level.	23. Ability to design and manage projects.
9. Capacity to learn and stay up to date with learning.	24. Commitment to safety.
10. Ability to search for, process, and analyze information from a variety of sources.	25. Spirit of enterprise; ability to take initiative.
11. Ability to be critical and self-critical.	26. Ability to act on the basis of ethical reasoning.
12. Ability to adapt to and act in new situations.	27. Ability to evaluate and maintain quality of work produced.
13. Capacity to generate new ideas (creativity).	28. Determination and perseverance in the tasks given and responsibilities taken.
14. Ability to identify, pose, and resolve problems.	29. Commitment to the conservation of the environment.
15. Ability to make reasoned decisions.	30. Ability to act with social responsibility and civic awareness.
	31. Ability to show awareness of equal opportunities and gender issues.

[6] See Dornbusche, Fischer & Samuleson (1977) and Ricardo (1817) for the theoretical arguments on comparative advantage and Porter (1985), for competitive advantage. Matsuzuka (2013) discusses the both theories in the context of higher education in globalization.

[7] Thus the unit of analysis in each region is university. For the comparative analysis, two sets of data each of which aggregated from the institutional data were merged and analyzed. The samples therefore cannot be deemed to represent the entire populations of EU and Japan.

By closely examining the comparability of the design and logistics of the surveys conducted in the EU and Japan, the EU-IV conducted in 2008 and Japan's surveys conducted in 2014 and 2016 were selected for comparative study[8]. Due to the full consistencies in the competence definitions utilized in the questionnaires, this paper focuses on generic competencies for the Euro-Japan comparative analyses. Table 2 presents a list of generic competencies. For each competence, respondents were asked to choose from a scale of 1 to 4 based on the degree of importance. Also, respondents in both regions were asked to select the top five important competencies.

Analysis and results

The following analyses were conducted using the merged dataset:

1) Comparative analysis of the mean values of the recognized importance of respective competencies in the survey, between EU and Japan.
2) Factor analyses for the degree of importance of respective competencies.
3) Correlation analyses to examine differences/similarities in the ranking of respective competencies among students, academics, graduates, and employers in Europe and Japan.

Importance of competencies

Table 3 compares the mean values of the degree of importance selected by stakeholders in the EU and Japan for 31 generic competencies. The greater the value, the greater the recognized importance. We can see non-trivial differences between the European and Japanese results in terms of important competencies. Table 4 reorganizes the findings in Table 3. The first column shows the competencies strongly recognized in both the EU and Japan. The second column shows the competencies recognized more in Japan than in the EU. The third column shows the competencies recognized more in the EU than in Japan. The criterion for a "highly important competence" was a mean value higher than 3.5. To determine the difference in the recognition of important competencies between the EU and Japan, the statistical significance of a t-test was used.

We can see that knowledge application, native communication skills, learning ability, and

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[8] The difference in time period that the surveys were conducted in the EU and Japan must be noted. Study by Beneitone and Bartolomé (2014) used the similar method comparing results in Europe in 2000 and 2008, Latin America in 2004 and Russia in 2011 and Africa 2011, reaching reliable findings. The result of this comparative study also reached meaningful results, but the future projects are expected to have more coherent organization for the time of the surveys.
See the following site for the detailed description of the survey project in the EU:
http://tuningacademy.org/tuning-europe-i-iv/?lang=en
See the following site for the detailed description of the survey project in Japan:
http://arinori.hit-u.ac.jp/en/project
For the reports from respective surveys, see the following:
http://arinori.hit-u.ac.jp/pdf/CompetenceSurvey2014Report_Eng.pdf
http://arinori.hit-u.ac.jp/pdf/CompetenceSurvey2015Report_Eng.pdf
http://arinori.hit-u.ac.jp/pdf/CompetenceSurvey2016Report_Eng.pdf

problem solving are recognized as important in both regions. Meanwhile, there are some significant differences in recognition between the two regions.

Table 3. Comparison of the mean values of recognized importance between EU and Japan

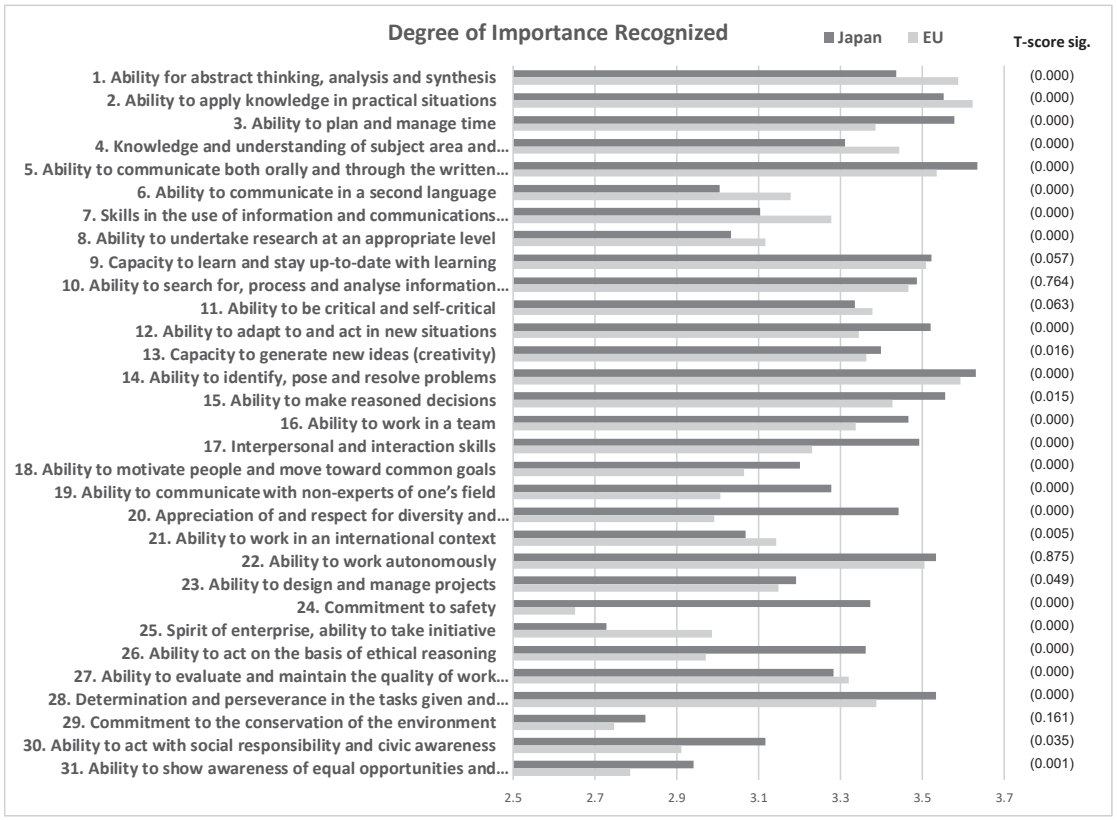

Table 4. Competencies recognized as important in the EU and Japan

Similarly recognized important	Higher in Japan	Higher in EU
➢ Ability to apply knowledge in practical situations (No. 2) ➢ Ability to communicate both orally and through the written word in native language (No. 5) ➢ Capacity to learn and stay up-to-date with learning (No. 9) ➢ Ability to identify, pose and resolve problems (No. 14) ➢ Ability to work autonomously (No.22)	➢ Appreciation of and respect for diversity and multiculturality (No. 20) ➢ Commitment to safety (No. 24) ➢ Ability to act on the basis of ethical reasoning (No. 26) ➢ Ability to make reasoned decisions (No. 15) ➢ Interpersonal and interaction skills (No. 17) ➢ Ability to work in a team (No. 16) ➢ Ability to plan and manage time (No. 3) ➢ Determination and perseverance in the tasks given and responsibilities taken (No. 28)	➢ Spirit of enterprise, ability to take initiative (No. 25) ➢ Ability to communicate in a second language (No. 6) ➢ Skills in the use of information and communication technologies (No. 7) ➢ Ability to undertake research at an appropriate level (No. 8) ➢ Ability to apply knowledge in practical situations (No. 2)

Factor analysis

In order to interpret and conceptualize the above results, all answers were evaluated through factor analyses. This was done to explore the latent factors that would explain the differences. The basic process employed for the factor analysis was principal component and/or maximum-likelihood method with the Kaiser-Guttman criterion with VariMax and, if appropriate, Promax. The results of the factor analyses are shown in Table 5.

Table 5. Factor analysis: Rotated solution

ROTATED FACTOR MATRIX		EUROPE & JAPAN						
		Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Communality
v30	Ability to act with social responsibility and civic awareness	**.774**	.198	.081	.084	.066	.129	67.27%
v31	Ability to show awareness of equal opportunities and gender issues	**.757**	.158	.056	.137	.012	.166	64.78%
v29	Commitment to the conservation of the environment	**.714**	.122	.010	.249	.230	-.131	65.71%
v26	Ability to act on the basis of ethical reasoning	**.704**	.221	.156	-.005	.056	.184	60.60%
v24	Commitment to safety	**.609**	.272	.057	-.055	.294	-.087	54.55%
v20	Appreciation of and respect for diversity and multiculturality	**.608**	.250	.145	.116	-.140	.340	60.20%
v17	Interpersonal and interaction skills	.268	**.679**	.034	.031	-.010	.254	59.91%
v16	Ability to work in a team	.231	**.675**	-.044	.156	.147	.089	56.54%
v18	Ability to motivate people and move toward common goals	.318	**.651**	.075	.205	-.003	.058	57.67%
v12	Ability to adapt to and act in new situations	.148	**.572**	.303	.067	.056	.123	46.37%
v03	Ability to plan and manage time	.100	**.520**	.154	-.028	.268	.182	41.03%
v15	Ability to make reasoned decisions	.162	**.501**	.388	-.014	.183	.076	46.72%
v25	Spirit of enterprise, ability to take initiative	.311	**.429**	.112	.399	.048	-.173	48.47%
v19	Ability to communicate with non-experts of one's field	.338	**.419**	.149	.101	-.058	.309	42.08%
v14	Ability to identify, pose and resolve problems	-.007	.291	**.622**	.037	.198	-.031	51.21%
v01	Ability for abstract thinking, analysis and synthesis	-.047	-.139	**.573**	.073	.172	.086	39.19%
v13	Capacity to generate new ideas (creativity)	.083	.186	**.542**	.361	.011	-.094	47.49%
v22	Ability to work autonomously	.102	.182	**.521**	.122	-.037	.230	38.43%
v11	Ability to be critical and self-critical	.170	.171	**.474**	.088	-.063	**.420**	47.08%
v08	Ability to undertake research at an appropriate level	.149	-.237	**.457**	.328	.316	.117	50.86%
v27	Ability to evaluate and maintain the quality of work produced	.374	.320	**.456**	.034	.170	-.013	48.06%
v28	Determination and perseverance in the tasks given and responsibilities taken	.319	.388	**.427**	-.026	.065	-.010	43.94%
v10	Ability to search for, process and analyse information from a variety of sources	.096	.118	**.414**	.204	.206	.366	41.26%
v09	Capacity to learn and stay up-to-date with learning	.113	.116	.374	.167	.360	.329	43.23%
v06	Ability to communicate in a second language	.006	.020	.106	**.766**	.103	.150	63.20%
v21	Ability to work in an international context	.195	.067	.250	**.735**	-.051	.051	64.98%
v07	Skills in the use of information and communications technologies	.059	.272	-.013	**.486**	.386	.231	51.58%
v23	Ability to design and manage projects	.167	.363	.389	**.416**	.038	-.180	51.79%
v02	Ability to apply knowledge in practical situations	.084	.339	.131	.091	**.620**	-.052	53.44%
v04	Knowledge and understanding of subject area and understanding of profession	.163	-.017	.295	.029	**.570**	.154	46.26%
v05	Ability to communicate both orally and through the written word in native language	.157	.246	.067	.055	.167	**.629**	51.62%

Six factors were identified. The competencies were grouped by factor and then rephrased as a competence (in *italics*) that synthesized the competencies in the group.

Factor 1:

30. Ability to act with social responsibility and civic awareness.
31. Ability to show awareness of equal opportunities and gender issues.
29. Commitment to the conservation of the environment.
26. Ability to act on the basis of ethical reasoning.
24. Commitment to safety.
20. Appreciation and respect for diversity and multiculturality

➢ *"Social responsibility and ethical thinking"*

Factor 2:

17. Interpersonal and interaction skills.
16. Ability to work in a team.
18. Ability to motivate people and move toward common goals.
12. Ability to adapt to and act in new situations.
3. Ability to plan and manage time.
15. Ability to make reasoned decisions.
25. Spirit of enterprise; ability to take the initiative
19. Ability to communicate with non-experts in one's field

➢ *"Interpersonality, motivation, adaptability, self-management"*

Factor 3:

14. Ability to identify, pose, and resolve problems.
1. Ability for abstract thinking, analysis, and synthesis.
13. Capacity to generate new ideas (creativity).
22. Ability to work autonomously.
11. Ability to be critical and self-critical.
8. Ability to undertake research at an appropriate level.
27. Ability to evaluate and maintain the quality of work produced.
28. Determination and perseverance in the tasks given and responsibilities taken.
10. Ability to search for, process, and analyze information from a variety of sources.

➢ *"Problem solving, analytical skills, creativity, and autonomy"*

Factor 4:

6. Ability to communicate in a second language.
21. Ability to work in an international context.
7. Skills in the use of information and communication technologies.
23. Ability to design and manage projects.

➢ *"Global skills"*

Factor 5:

2. Ability to apply knowledge in practical situations.
4. Knowledge and understanding of the subject area and understanding of the profession.

➢ *"Knowledge management"*

Factor 6:

5. Ability to communicate both orally and through the written word in native language.
11. Ability to be critical and self-critical.

➢ *"Basic communication skills and critical thinking"*

Table 6. Competencies recognized as important in the EU and Japan

Higher in Japan	Factor	Higher in Europe	Factor
➢ ➢ Appreciation of and respect for diversity and multiculturality (No. 20) ➢ Commitment to safety (No. 24) ➢ Ability to act on the basis of ethical reasoning (No. 26)	1	➢ Ability to communicate in a second language (No. 6) ➢ Skills in the use of information and communication technologies (No. 7)	4
➢ Ability to plan and manage time (No. 3) ➢ Ability to make reasoned decisions (No. 15) ➢ Interpersonal and interaction skills (No. 17) ➢ Ability to work in a team (No. 16)	2	➢ Ability to undertake research at an appropriate level (No. 8) ➢ Spirit of enterprise, ability to take initiative (No. 25)	3 2
➢ Determination and perseverance in the tasks given and responsibilities taken (No. 28)	3	➢ Ability to apply knowledge in practical situations (No. 2)	5

In Table 6, the competencies are grouped by the factors extracted above. In the Japanese context, recognition of the important competencies is explained by such factors as social responsibility, ethical thinking, interpersonal skills, and self-management. In the EU, the recognition is explained by more technical factors, including global skills, research skills, initiative, and knowledge management. While Japanese stakeholders are more likely to appreciate less quantifiable, personal qualification-type competencies, EU stakeholders value more quantifiable, specific, and skill-based competencies.

Correlation analysis

Next, we examined the extent to which the recognition of important competencies is shared among academics, employers, graduates, and students. Table 7 shows the results of the correlation analysis that examined differences/similarities in the ranking of competencies among students, academics, graduates, and employers in Europe and Japan[9]. The upper left shows the correlation among the four stakeholders in Japan, the lower right shows the correlation in the EU, and the lower left shows the correlation between the stakeholders in the EU and those in Japan.

Table 7. Correlation matrix for importance as recognized by different stakeholders in Japan and the EU

		Japan				EU			
	PEARSON	Academics	Students	Graduates	Employers	Academics	Students	Graduates	Employers
Japan	Academics	1							
	Students	.945**	1						
	Graduates	.725**	.876**	1					
	Employers	0.345	.462**	.691**	1				
EU	Academics	.923**	.863**	.610**	0.153	1			
	Students	.818**	.835**	.694**	0.287	.906**	1		
	Graduates	.836**	.851**	.717**	0.303	.922**	.988**	1	
	Employers	.789**	.827**	.753**	.416*	.852**	.965**	.966**	1

First, let us look at the upper left table to compare the recognition of different stakeholders in Japan. Compared with academics, students have the most similar recognition (.945). Graduates have the next most similar recognition with academics (.725), and employers have the least similar recognition with academics (.345). In terms of students, they again have a strong correlation with academics (.945), a weaker correlation with graduates (.876), and the weakest correlation with

[9] In the ranking analysis, the top competence took a value of 5; second, 4; third, 3; forth, 2; and fifth, 1. The values were accumulated for each competence and normalized by the number of cases. The same correlation procedure was conducted with the value of importance, and similar results were observed. See Matsuzuka (2019).

employers (.462). In terms of employers, the correlation with academics is the weakest, then becomes stronger with students (.462) and graduates (.691). It appears that the distance from school explains the differences in competence recognition between stakeholders: the shorter the distance the stronger the correlation, and the further the distance, the weaker the correlation. Looking at the table for the EU, first, the correlations among the stakeholders are generally higher than those in Japan. But it is the same as Japan in that the recognition of academics and that of employers are the least similar. Unique to the EU is that recognition among students, graduates, and employers has quite a lot in common.

Now, let us look at the lower left table, which shows the correlation between Japanese stakeholders and EU stakeholders in their ranking of important competencies. It is noteworthy that the recognition of Japanese academics of important competencies is not very different from that of stakeholders in the EU. The correlation between the recognition of Japanese academics and that of EU academics is .923, which is the highest value among all the correlations among the stakeholders. The correlation between Japanese academics and EU students is .818, between Japanese academics and EU graduates is .836, and between Japanese academics and EU employers is .789. These values are much higher than those between Japanese academics and Japanese employers as well as Japanese graduates.

Indeed, Japanese employers' recognition of important competencies is significantly different from that of all stakeholders in the EU. First, the correlation between Japanese employers and EU academics is .153, which is not even statistically significant. Similarly, the correlation between Japanese employers and EU students and between Japanese employers and EU graduates are .287 and .303, respectively, and not statistically significant. The correlation between Japanese employers and EU employers is relatively higher at .416, but EU employers have a much higher correlation with Japanese graduates (.753), Japanese students (.827), and Japanese academics (.789).

Due to the above findings on the unique recognition of Japanese employers, attention should be drawn to what competencies are specifically valued by Japanese employers compared with other stakeholders. This is a crucial question in the development of competency-based education since the learning goals are set through consultation with employers. For both Japanese students who might work in other countries and for foreign students who might search for a job in Japan, the unique expectations of Japanese employers must be carefully recognized.

Focusing on the employment setting, competencies valued by employers in Japan and the EU are compared in Table 8. These are the top five competencies that employers in both regions ranked as important.

Table 8. Top five competencies as ranked by employers in Japan and the EU

	Employers in Japan	Employers in the EU
First	16. Ability to work in a team.	10. Ability to search for, process, and analyze information from a variety of sources.
Second	5. Ability to communicate both orally and through the written word in native language.	22. Ability to work autonomously.
Third	17. Interpersonal and interaction skills.	9. Capacity to learn and stay up to date with learning.
Forth	26. Ability to act on the basis of ethical reasoning.	1. Ability for abstract thinking, analysis, and synthesis.
Fifth	24. Commitment to safety.	4. Knowledge and understanding of the subject area and understanding of the profession.

Looking at the highly ranked competencies in the results of the factor analysis, the preferences of employers in Japan are expressed by *Social responsibility and ethical thinking* (No.26, No.24), *Interpersonality, motivation, adaptability, self-management* (No.16, No.17), and *Basic communication skills and critical thinking* (No.5). The preferences of employers in the EU, on the other hand, are expressed by *Problem solving, analytical skills, creativity, and autonomy* (No.10, No.22, No.1) and *Knowledge management* (No.4). We can fairly conclude that employers' expectations related to university graduates are quite different between Japan and the EU.

Findings from the empirical analyses can be summarized as follows:

- There were significant differences between the EU and Japan when it came to the important competencies that university graduates were expected to have.
- Japanese were more likely to value competencies relating to social responsibility, ethical thinking, interpersonal skills, and self-management (personality-based competencies), while Europeans were more likely to value global skills, research skills, initiative, and knowledge management (more specific and skill-based competencies).
- The difference was particularly remarkable with Japanese employers. Their expectations regarding the competencies of university graduates were not shared by stakeholders in either Japan or the EU.
- The recognition of Japanese academics was similar to European stakeholders, including European employers.

Preference of Japanese employers for personality-based competencies would not be surprising for most Japanese. Japanese companies have long implemented "permanent employment system" or "lifetime employment system" where new graduates are hired right after the graduation and then employed for life. The trainers of workers are not universities or colleges but the employers. Therefore, it has been generally viewed that Japanese employers do not expect new graduates to have specific work skills. Rather they appreciate interpersonal, soft skills since such personality-based

competences are deemed effective for inhouse skills development and transfers. In the meantime, it is new to find that Japanese academics and students have similar recognition over the important skills with stakeholders in the EU. More and more academics have acquired advanced degrees in other countries, mostly in Western countries. Also increasing number of students have studied abroad. These trends may have reduced the gap between academics and students in Japan and the stakeholders in the EU. These results call for a careful consideration on how university graduates should be prepared to work in the global job market.

Conclusion

Outcome-oriented, competency-based education was developed over the past century at different levels of education. The education model has been discussed in higher education particularly over the past two decades, mostly in developed countries. The increasing attention paid to accountability and growing student global mobility have called for competency-based learning, which enables the enhancement of the visibility and transferability of the content that students learn. Outcome-oriented, competency-based teaching and learning has thus been deemed as contributing to higher education. This educational approach in the meantime has faced serious criticism for both its pedagogy and feasibility. One persistent claim relates to the difficulty of agreeing on and defining which competencies need to be acquired from a university education. This issue is particularly serious in higher education since at this level it is important to closely listen to the voices of society and industry in the wider market, extending to the global market.

The empirical part of this paper intends to explore the validity of outcome-oriented, competence-based education for higher education in the age of global student mobility. The surveys used for the empirical analysis had a certain limitation in the sampling design to represent the “entire” EU and Japan respectively. But the surveys distributed through universities to all groups of their stakeholders including students, academics, graduates and their employers enabled us to perform unique analyses to compare the recognitions of important competences among different stakeholders in different regions. The results of the analyses indicated that there are significant differences between the EU and Japan over the competencies that university graduates are expected to have. This finding suggests a difficulty in implementing competency-based model in an international setting, supporting the discussions of Ainsworth (1977) who noted the problem of specifying important competencies, and of Voorthees (2001) who addressed practical concerns about measuring and reporting competencies. The regional difference in the recognition of important skills, in turn means that both regions have their own unique recognitions of important skills. Such uniqueness, according to the theory of comparative advantage, may enable both regions to explore their comparative value in higher education, which functions to facilitate interregional student mobility.

By closely comparing the recognition of important skills by different stakeholders, we found the

difference in recognition was particularly remarkable with Japanese employers. The unique perceptions or needs of Japanese employers regarding the skills and competencies of potential employees are known to most Japanese. However, this is the first time that their uniqueness was compared statistically with other countries. On the one hand, universities in Japan have been increasingly expected to respond to the needs of industry. On the other hand, internationalization is one of the most important mission for universities, and more students have been and will be traveling overseas to study and work. Then, the peculiar expectations of Japanese employers bring about a substantial "practical" challenge to both students and universities. Students who plan to study and work overseas must be cautious in their expectations for both Japan and their destination country. Universities must consider the "needs of industry and society" from global perspectives. They will need to develop curricula, courses, and programs flexibly for both domestic and international students.

This, however, does not mean that outcome-oriented, competence-based education is meaningless or infeasible in higher education. Nor does this mean that universities in Japan should design their curricula with consultation from employers in other countries. Descriptions of competencies developed through the existing teaching and learning could and should be done without harm. Such information would significantly help students with their learning and career planning. For more advanced development or implementation of outcome-oriented, competency-based education in a global setting, we need to know more about the facts and requirements of different university stakeholders in the global higher education community. With Japanese employers, we should confirm if the respondents to the survey represent the whole organization, including the management and international relations department. If they do, what are the advantages and disadvantages in business and corporate management in setting such competence priorities? Are these priorities due to the cultural and historical development of Japanese society, or are they due to more rational corporate performance-oriented management policies? From a global perspective, we want to know how the competencies that are recognized as important are similar or different in regions other than the EU and Japan. Particularly the inclusion of the US, the largest recipient of international students and China, the largest sender of students studying abroad is indispensable. We want to elucidate how the similarities and differences among different regions are reflected in curricula design and academic performance on the university side, and in employment and corporate or organizational performance on the industry side. Moreover, we want to explore how we can formulate the priorities of academics and universities to bear a "knowledge creating" rather than "needs responsive" role. Through cross-regional comparative analyses, competence surveys can be more than just a method to redesign and enhance higher education learning. Through creative utilization and careful interpretation of the results, the surveys would enable us to reconsider academics' role and their relation to society.

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