An International and Comparative Perspective of the Academic Profession's Development: With a focus on R-T-S Nexus in the world and Japan

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Abstract. There is a hypothesis that Research-Teaching-Study Nexus (R-T-S Nexus) should be developed as an ideal of modern university constantly since its proposition by Wilhelm Humboldt in 1910.

Despite given hypothesis, however, it has not been necessarily accepted by the AP (Academic Profession) in the world according to Carnegie, CAP and APIKS surveys, the three international and comparative surveys on the AP, conducted during past thirty years. Difficulty of realizing compatible research and teaching is thought to be a negative preposition for realization of R-T-S nexus.

How to eliminate such difficulty is indispensable for the AP in the world. As far as Japan is concerned, the national policy of research orientation has been worked for priority of research-university rather than teaching-university. This doctrine has been internalized strongly in the AP's consciousness in all universities and colleges to the extent that realization of the given ideal of R-T-S nexus is hardly successful.

Keywords: academic profession, R-T-S Nexus, academic productivity, Wilhelm Humboldt, Burton Clark, Heintz-Dieter Meyer, Carnegie Survey, CAP Survey, APIKS Survey

Introduction

There is a hypothesis that the academic profession (AP) in the world is expected to pursue constantly R-T-S Nexus, an integration of research, teaching and study function, that Wilhelm von Humboldt proposed as an ideal of scholarship in the modern university. Nevertheless, it is true to recognize that the scholarship of research orientation, or research paradigm, has been prevailing persistently throughout the world according to several international surveys on AP.

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This paper attempts to shed light on the given theme "An International and Comparative Perspective of the Academic Profession's development: With a focus on R-T-S Nexus in the World and Japan" by making analysis of the results gained from the past international surveys of AP as follows: Carnegie survey conducted in 1992; the CAP (Changing Academic Profession) survey conducted in 2007; the APA (Academic Profession in Asia) survey conducted in 2012; STEM (APIKS) survey has been conducted since 2018.

1. Framework

(1) Academic productivity and Humboldtian ideal

Main academic work consists of two types of R-T-S Nexus. The first type consists of research, teaching and service responding to knowledge functions such as discovery, dissemination and application, respectively. The second type consists of research, teaching and study (learning) responding knowledge functions such as discovery, dissemination and understanding. Two types are difficult to discriminate their contents, since both of them are coincidentally called as R-T-S Nexus in an abbreviation form. This paper intends to focalize the second type of R-T-S Nexus, or an integration among research, teaching and study, although successful integration of these two types is necessary for the prosperity of academia.

Among these knowledge functions, "understanding" is indispensable to both academics and students who are required "study" as more advanced type of understanding. For a standpoint of academics "research" is needed as more advanced type of study almost equivalent to inquiry and for a standpoint of graduate students it is needed just like academics because research and inquiry are thought to be inevitable functions at this advanced stage of academia. Indeed, Burton Clark called it "the place of inquiry" and "a culture of inquiry" (Clark, 1995, 2007).

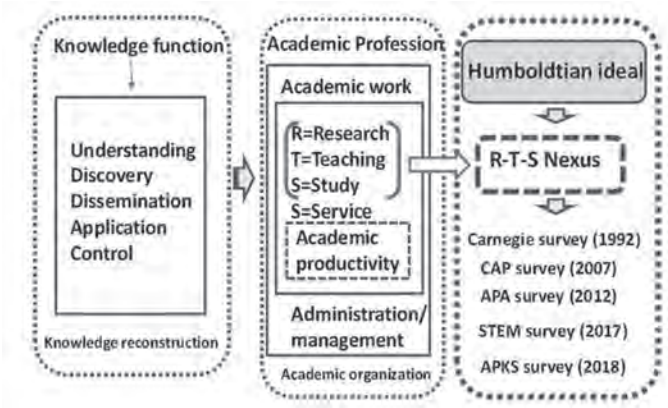


Figure 1. Framework of research: Knowledge, AP, academic work and R-T-S-Nexus

As Figure 1 shows, academic productivity is based on academic work consisting of three individual functions of research, teaching and study. "Academic productivity" was named by Michiya Shinbori for the first time in 1973 in order to modify the concept of "scientific productivity" which was introduced by Robert K. Merton in the field of sociology of science (Shinbori, 1973; Merton, 1973). The reason why modified term was needed at that time was owing to original intention of breaking down narrow meaning of scientific productivity focusing on only natural science without including humanities and social science. In other words, it was restricted to narrow concept of natural science in all sciences from natural science to humanities and social science. Making the concept of scientific productivity, Merton did not use broad concept of science equivalent to that of "Wissenschaft", or scholarship, because he thought that kind of science concept is too wide to testify positively scientist's scientific productivity.

In this context, academic productivity possesses intimate relationship with Humboldtian concept of R-T-S Nexus dealing with it under the broad concept of science equivalent to Wissenshaft (Cf. Meyer, 2017). It also possesses intimate relationship with Earnest Boyer's idea of *Scholarship Reconsidered* (Boyer, 1990).

(2) Core of Humboldtian ideal

Quintessence of Humboldtian concept exists in what may be called "the three unities," according to Heinz-Dieter Meyer who described them as follows.

> "The integration of three conventionally conflicting but potentially self-enriching opposites of teaching *and* research; scientific discovery *and* moral formation ("building"); *and* scholarly autonomy and scholarly community." (Meyer, 2017, p.40).

Among the three unities, this ariticle pays attention to teaching *and* research and also the academic profession (AP) consisting of a series of categories of academics, teachers, researchers and faculties, especially the AP's involvement to R-T-S Nexus with focus on research and teaching function in academic work and academic productivity.

Bowen and Shuster describe instruction as the main function of faculties, or academics, as follows.

> "The main function of faculties is instruction that is direct teaching of students. Instruction involves formal teaching of groups of students in classrooms, laboratories, studio, gymnasia, and field settings." (Bowen & Shuster, 1986, p.15).

In the teaching and study process in the classrooms, teaching and research are two main vehicles and how to integrate these two functions is important problem to be realized by faculties, or academics.

> "Faculties contribute to the quality and productivity of society not only through their influence on students but also directly through the ramified endeavors we call [research]. This term is used as shorthand for all the activities of faculties that advance knowledge and the arts. These include humanistic scholarship, scientific research in the natural and social sciences, philosophical and religious inquiry, social criticism, public-policy analysis, and cultivation of literature and the fine arts." (Ibid. p.16)

Academics' two functions of instruction, especially teaching, and students' function of study are consisting core parts of R-T-S Nexus coinciding to Humbordtian ideal.

(3) AP is expected to realize R-T-S Nexus in the 21st century

Figure 2 shows the framework of concept that university is changing from community of knowledge to enterprise of knowledge over the time span of past-present-future (Arimoto, 2011, p.2). Based on this trend, the AP is also changing from A through B and C to D. We analyzed the existing situation of each stage of the AP's development. As for B stage we analyzed it on the basis of data obtained from the Carnegie 1992 survey (Altbach, 1996; Arimoto & Ehara, 1996). As for C stage we analyzed it on the basis of two data sources from the CAP 2007 survey (Arimoto, 2008, 2014; Arimoto, Cummings, Huang & Shin, 2015; Kogan & Teichler, 2007; RIHE, 2008, 2009, 2011, 2015) and also from APA 2012 survey (Arimoto, Daizen & Kimoto, 2013). Finally, we are now going to make analysis of D stage on the basis of data to be obtained from the APIKS 2018 survey which was nominally started from STEM 2017 survey (Arimoto, 2018a).

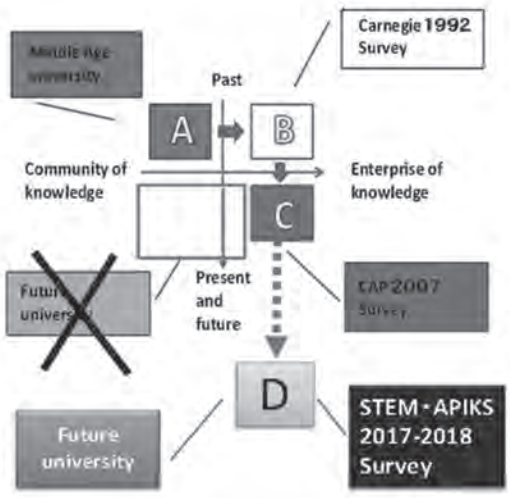


Figure 2. Changing university and academic profession

In about 900-year history of university from the first stage proper to the Middle Age university to the second stage proper to modern university, teaching was prevailing for as long as 700 years in the first stage before 19th century, while research was prevailing for only 200 years in the second stage after 19th century. Learning related to student's main activity was prevailing for a long time in the first and second stages, while it is expected to make transformation from students' passive learning to active study after an introduction of Humboldtian model into academia.

In the third stage, which is likely to be quite different from the former two stages with respect to the fact that student's super diversification is in the process of increasing in relation to universal stage of higher education development. How to support individual student to realize his/her own latent possibility to maximum level has increasingly become academics' inevitable vision. A traditional teaching and learning process in the classroom should be expected to shift to an innovative teaching and study process, in which much weight is put on teacher's active teaching and student's active study. Accordingly, the AP is proclaimed to pursue not only compatible research and teaching but also R-T-S Nexus (Arimoto, 2018b, c).

In this context of framework, a hypothesis is that the AP in the world including Asia and Japan is going toward an ideal direction of realizing R-T-S Nexus in the 21st century. On the contrary to this hypothesis, however, it is likely to be going toward the different direction deviating from ideal direction, or rather toward the opposite direction. This paper intends to discuss this kind of undesirable trend in more detail in the following parts.

2. An international comparative study of the AP in the world: with a focus on Carnegie, CAP, APA and APIKS surveys

Despite given hypothesis of realizing R-T-S Nexus, it has not been necessarily accepted by the AP in the world, according to the results of three international and comparative surveys on the AP conducted during the past thirty years.

A concept of R-T-S Nexus has developed well in the level of ideal since Humboldtian ideal was probably released directly or not directly by himself in 19th century, at least since the concept was described in the paper of 1910 and in addition Burton R. Clark interpreted and developed it as R-T-S Nexus concept in 1997 (Humboldt, 1910; Clark, 1997). However, its real institutionalization into higher education has not been developed well in the world, although the AP has been making more or less efforts to make contribution to such institutionalization. Unfortunately, this rather negative fact has been testified clearly not only in the world but also in Japan, according to the evidences based on the results of four international surveys.

(1) Carnegie, CAP, APA and APIKS surveys

a. Carnegie survey (1992)

Carnegie survey on the AP was conducted in 1992 with the participation of 14 countries (in reality, 13 countries including Argentina, Australia, Brazil, Germany, Israel, Japan, Korea, Mexico, the Netherlands, Russia, Sweden, U.K., U.S., and one region, Hong Kong). In the first international survey, outcome of academics' research orientation and teaching orientation by country was categorized tentatively into three types (Arimoto & Ehara, 1996).

Type 1: Strong research orientation which was called as German type (including five countries such as the Netherlands, Japan, Sweden, Germany, and Israel).

Type 2: Compatible research and teaching orientation which was called as Anglo Saxon type (including four countries such as U.S., U.K., Australia, and Hong Kong).

Type 3: Strong teaching orientation which was called as Latin American type (including four countries such as Chile, Mexico, Brazil, and Russia).

b. CAP survey (2007)

Changing Academic Profession (CAP) survey was conducted in 2007-2008 with the participation of 19 countries (in reality, 18 countries including Argentina, Australia, Brazil, Canada, China, Finland, Germany, Italy, Japan, Korea, Malaysia, Mexico, the Netherlands, Norway, Portugal, South Africa, U.K., U.S., and one region, Hong Kong) (Arimoto, 2008).

The results of this survey were published by Springer's series of The Changing Academy: The Changing Academic Profession in International Comparative Perspective, in the forms of 26 volumes including some volumes focusing on R-T-S Nexus model (Teichler, Arimoto & Cummings, 2013; Arimoto, 2013, 2014; Shin, Arimoto, Cummings & Teichler, 2014; Arimoto, Cummings, Huang & Shin, 2015).

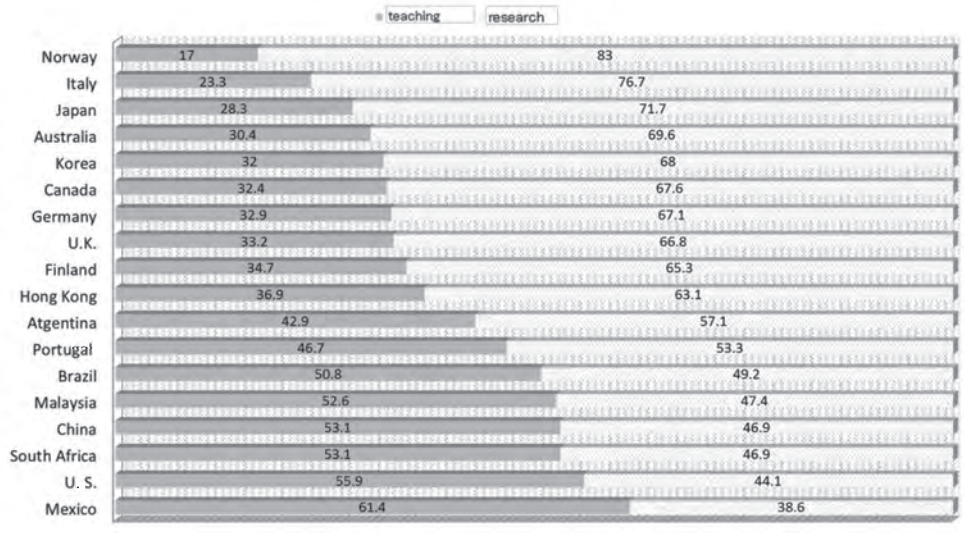


Figure 3. Teaching and research orientation by country (%)

In the CAP survey, the most shocking fact was that research orientation increased surprisingly, whereas teaching orientation decreased (Arimoto, 2011). As shown in the Figure 3 “Teaching and research orientation by country (%)”, the advanced countries are higher in the percentage of research orientation as follows: Norway (83%); Italy (77%); Japan (72%); Australia (70%); Korea (68%); Canada (68%); Germany (67%); U.K. (67%), while the emerging countries are higher in that of teaching orientation as follows: Mexico (61%); U.S. (56%); South Africa (53%); China (53%); Malaysia (53%); Brazil (51%). Among these various percentages, it is remarkable that the U.S. as one of the most advanced countries reveals higher percentage in the relative importance of teaching orientation as if she is belonging to the group of emerging countries.

Research orientation type recognized in the past surveys maintained the same trend constantly and rather strongly even at this time, while the other two types were inclined increasingly to research orientation type.

Summing up the trends analyzed in the past two surveys, Carnegie and CAP, we can recognize that the AP in the world, especially in the advanced countries, has been strengthening research orientation. On the other hand, the developing countries have been moving toward research orientation gradually, although they are still keeping fairly strong conformity to teaching orientation.

c. APA survey (2012)

In the APA survey conducted to Asian countries including six countries such as Vietnam, China, Cambodia, Japan, Malaysia and Taiwan. Among those, all countries except Japan and Taiwan were recognized that they were belonging to teaching orientation type just like Latin American type described previously (Arimoto, Daizen & Kimoto, 2013). Given this fact, the future image of the Asian AP may follow the trends similar to the Carnegie and Cap surveys. Concretely, the Asian AP excluding Japan and Taiwan is likely to follow the transformation pattern like the Latin American type. Belonging to Latin American type at the time of Carnegie survey, it would be moving toward research orientation of German type in the future in accordance with the concrete trend of Latin American type shifting during some fifteen years from Carnegie survey to CAP survey.

d. APIKS survey (2017~)

This is the most recent international survey including almost 35 countries with the additional countries based on 29 countries participated in CAP survey. The results of the data have not published officially yet, although they were presented partially in the international conferences in Hiroshima (March, 2019) and Kassel (August, 2019). As far as the result of Japanese AP is concerned, conformity to German model is still strong averagely: 72.5% in Carnegie; 71.6% in CAP; 73.7% in APIKS, even though small private universities are now changing to Anglo Saxon model or even to Latin American model (Arimoto, 2018b, c). Perhaps, almost all countries worldwide are going to

conform to German model except a few countries such as the U.S. and Mexico according to the data gained at the CAP survey. On the contrary to this prediction, both counties might be going to the same direction just like many countries' locus.

e. Social changes and their impact on the AP in the past surveys

At the time of Carnegie survey in 1992, economic situations were promoting positively and it seemed to reflect on the AP's orientation to rather high share of Anglo Saxton model as well as Latin American model. Sixteen years later, however, CAP survey was conducted in 2008 when economic situations changed rapidly throughout the world by the effect of the financial crisis of 2007–2008. During the crisis, universities' differentiation extended to more separation of research universities and non-research universities due to social stratification's extension and also due to rising competition among research universities by emerging world university ranking. Governments invested much more monies and resources to the sector of research universities and as result of it research orientation was likely to intensify in almost universities worldwide.

Ten years later, APIKS survey was conducted originally from STEM survey in 2017 when economic situations were recovering to a considerable degree in the World except in Japan at least. Probably, all countries are still converging to German model, or research orientation. Asian countries such as China (and Hong Kong), South Korea, Singapore, Taiwan, etc. are gradually becoming active in academic productivity to the extent that they are quickly climbing the world university ranking ladder. Japan is now gradually loosing position in academic productivity, even though it was a leading country in Asia for a long time.

(2) Current situation of the AP in Asia and Japan

Given the results of previous surveys analyzed from an international comparative perspective, the traits of AP in Asia and Japan are recognizable as follows:

a. Among Asian countries, two countries such as China and Malaysia belong to Latin American type in CAP survey.
b. One country and one region such as Korea and Hong Kong are shifting from Anglo Saxon type at the stage of Carnegie survey to German type at the stage of CAP and APA survey.
c. Japan is keeping German type constantly through all stages of surveys for 20 years from 1992 to 2012.

Generally speaking, it may be said from an international and macroscopic perspective that there is somewhat similarity in the AP's orientation to teaching and research among the countries

participating in the previously mentioned surveys in the world. In other words, we can observe more or less the same kind of trend in the AP in Asia and perhaps among the West, Asia and Japan. The reason why the AP's trend in the West is also available in the AP's trend in Asia may be explained from a historical perspective of universities and colleges in Asian countries. Because they have attempted to import a series of concepts related to both academia and academic from the West successively after the first institutionalization of their modern universities and colleges in more or less than a century ago.

However, Asian countries are now changing rapidly to the extent that they are enhancing actual competitive abilities of the AP equivalent to those of the counterpart in the West in light of cooperation and competition. To make a comparative study of the AP among the countries in the world, new international comparative survey of the AP just like APIKS, which will succeed to a series of outcomes of the past surveys conducted in Carnegie, CAP, APA and STEM, is desired to be conducted continually in the future.

(3) International phenomenon of convergence to research orientation against R-T-S Nexus

a. Convergence to research orientation

In the Carnegie survey conducted 25 years ago, the AP worldwide showed three basic types and in addition Anglo Saxon type with conformity to a characteristic of compatible research and teaching orientation was rather optimistically expected to extend more in the future. However, in the CAP survey, all two types other than the German type showed newly changing trends together with a phenomenon of convergence to the German type of research orientation.

Figure 4 which is based on Figure 3 shows a comparison between academics' preferences in teaching and research orientations by country. The overall average research orientation (65%) is more than teaching orientation (35%) in the advanced countries, while the former (47%) is less than the latter (54%) in the emerging countries.

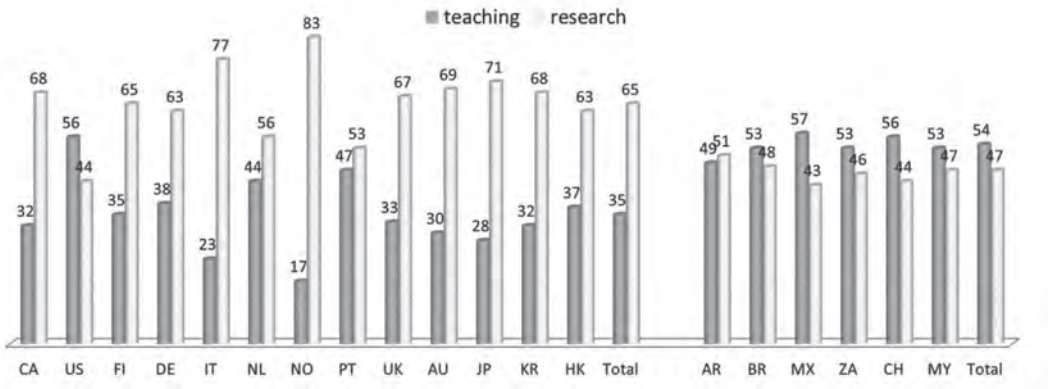


Figure 4. Preferences in teaching and research by country (%)

Research orientation (research>teaching) is recognized in thirteen countries: Norway, Italy, Japan, Australia, Canada, Korea, U.K., Finland, Germany, Hong Kong, Argentina, the Netherlands and Portugal. Contrary, teaching orientation is recognized in six countries: Mexico, U.S., China, South Africa, Malaysia and Brazil. Ranking order from the top share to the bottom share is as follows: Norway (83%), Italy (77%), Japan (71%), Australia (69%), Canada (68%), Korea (68%), UK (67%), Finland (65%), Germany (63%), HK (63%), Netherlands (56%), Portugal (53%), Argentina (51%), Mexico (57%), US (56%), China (56%), South Africa (53%), Malaysia (53%) and Brazil (53%)

b. R is strong in R-T-S Nexus

As far as the surveys on the AP in the world are concerned, it is likely to be true to convey that AP has not moved thus far to R-T-S Nexus type as an ideal type of 21st century. In light of R-T-S Nexus model, convergence to R (research orientation) is absolutely prevailing compared to that to T (teaching) and much more to S (study).

c. Institutionalization of Humbordtian model into the U.S.

In the past 25 years, academics in Mexico and the U.S. have showed their own particular movements toward the directions different from those in other countries, which have increasingly strengthened their research orientation. Perhaps, the U.S. is thought to be the most leading country in light of a future model of the AP in the world, because the trend of constantly keeping Anglo Saxon model in the past 25 years may be remarkable to forecast a goal on which many countries are converging in the future.

The U.S. tried to catch up with German model, especially Humboldtian model, which was consisting of “the three unities” mentioned above since 19th century when more or less than 9,000 students went to Germany as the center of learning in the world (Olson & Voss, 1979). American academics have introduced “the three unities” since then to a considerable degree as follows.

ⅰ. As for integration of conflicting teaching and research, they could be successful to make reform teaching innovation as a form of starting elective system in the 1860s leading to both active teaching and active study later in the 1980s (Chickering & Gamson, 1987; Bonwell & Eison, 1991). Incidentally, in the case of active study, Japan is trying to catch up with the American trend of active study twenty years since.

ⅱ. As for an integration of scientific discovery and moral formation (“Bildung”), they could be successful in pursuing liberal education (general education) in the undergraduate course, while starting research and professional education as well in the graduate course. By the way, in the case of liberal education, Japan is now declining in following the U.S. style, since 1993 when deregulation of curriculum was introduced into academia throughout the

country by the MEXT, although Japan imported it once into the faculty of general education (*Kyoyoubu*) in academia and continued ceaselessly during the postwar time (Arimoto, 2016).

iii. As for realizing both scholarly autonomy and scholarly community, American academics could be successful in maintaining collegial rule in the department system. In the case of academic freedom, for example, the U.S.'s realization of it recorded almost highest score among all countries in the world according to the statistics of CAP survey. For example, response rate (%) to the issue on "Academics' perceptions of support of academic freedom by the administration of their institution of higher education" is highest among the five countries as follows: US (61%), Japan (55%), UK (39%), Germany (34%), Norway (31%), and South Africa (26%) (Teichler, Arimoto & Cummings, 2013, p.186).

As described previously, Burton Clark recognized the R-T-S Nexus and insisted on the importance of a "three component nexus," inquiring five national higher education systems including France, Germany, U.S. and Japan in a perspective that research becomes simultaneously interfused with teaching and study (Clark, 1995, p.12). Among four systems, he testified by comparative study that U.S. is most advanced system in terms of R-T-S Nexus, specifying the institutional and cultural conditions working in the U.S. system with regard to keeping the bundle of research, teaching and study together.

> "At the base, operational conditions are captured in the twin concepts of research group and teaching group, each dependent on the other and closely intertwined in a veritable double helix of linkage and interaction. These twin settings for professors and students permit the linked transmission of tacit and tangible knowledge." (Clark, 1995, p.3; Cf. Kalleberg et al., 2007, p.xx)

In this context, it is not deniable that many countries are expected to reach to R-T-S Nexus in the future, perhaps during 21st century, if they will attempt as much as possible to follow the U.S. practice as an ideal model.

3. Perspective of the transformation from incompatible research and teaching to compatible research and teaching

R-T-S Nexus has not been realized well among the AP in the world thus far, although the transformation from an incompatible research and teaching to a compatible research and teaching has been developed to a considerable degree in the Anglo-Saxon countries at the stage of Carnegie survey. The positive trend observed in the Anglo-Saxon countries would be expected to extend more at the stage of CAP survey. Unfortunately, however, such extension has not been realized well as expected

until today in addition to a positive result observed in the Anglo-Saxon model at that time. Rather than extension, it has been forced to become almost reduction.

Many countries were inclined to conforming to research orientation instead of teaching and study orientation. It is not clear yet what trend is occurring in the third stage of a series of international survey, or APIKS survey, because sufficient information has not been available thus far except Japanese trend, in which the Japanese AP's consciousness of conforming to research orientation is still high as was shown in the previous stages.

4. Difficulty and possibility of realization of R-T-S Nexus: With a focus on a case study of Japanese AP

An existing barrier with a great deal of difficulty of realizing compatible research and teaching is easily guessed to be a negative preposition for realization of R-T-S Nexus. How to eliminate such barrier is likely to be indispensable effort for the AP in the world in order to realize its own substantial professionalization.

This kind of international situation suggests that higher education research regarding the AP has not necessarily given sufficient effects on higher education policies regarding the AP thus far in order to resolve existing problem. Research orientation has been prevailing in the universal stage of higher education in which teaching orientation is expected to be strengthened in response to students' super diversification, because of the reason that students are increasingly needing R-T-S Nexus instead of prevailing research orientation in the universities and colleges. For example, a case study of Japanese AP which has been pursuing German model of research orientation persistently has not been successful in respect to giving the sufficient effects on higher education policies.

(1) Recent trend of the AP in Japan in terms of realization of R-T-S Nexus

There are quite a few indicators dealing with the Japanese AP in an international comparative perspective made in a series of surveys as follows: academic productivity; governance and academic freedom; evaluation; degree; academic activity; gender and age; income; social and economic stratification; facilities, equipment and environment; research and teaching orientation; job satisfaction; psychological strain, etc.

Among these indicators, an indicator of "research and teaching orientation" has direct relationship with a goal attainment of R-T-S Nexus. An indicator of "academic productivity" consisting of academic work and integration among research, teaching and study is necessarily for fruitful goal attainment. As for an indicator of "governance and academic freedom", for example, Japanese academia has changed greatly to the extent that faculty staff's involvement in governance and

academic freedom has been limited extremely because of introducing the revised top-down type school education law in 2015. In other words, the governance of MEXT related to the function of president in the individual academia has been strengthened greatly at the sector of national, private and local university throughout the country and the management of such president related to the function of faculty meeting has been strengthened greatly as well, while the power of faculty meeting has been lost substantially (Arimoto, 2015a).

A characteristic related to Governance and academic freedom has been changing rapidly within two decades from collegiate, through bureaucracy and corporation, to enterprise in the world, especially in the advanced countries more than the emerging countries, according to McCnay (1995). It is also true to explain that this kind of trend in the Japanese academia and therefore academic organization has been recognizable in its changing dominant governance model from a university type of autonomy with self-government to a corporation type of heteronomy.

(2) Separation of research and teaching

Policy of selection and concentration, which was politically focused on strengthening a small sector of research-university by MEXT, perhaps more or less than 5% of all universities, has been accelerating university differentiation into two poles, partially expanding separation of the research-university and partially expanding separation of the non-research-university. The research-university sector can enjoy much more research time and resources leading to much more research productivity thanks to the national government's intensive investment of much more moneys and resources to this sector. On the other hand, the non-research-university is decreasing important factors such as research time, resources, and research productivity, even though it is traditionally involved so much in research orientation as far as consciousness of academics is concerned.

In this policy, academics in research-university are forced to be involved in more research than in teaching as well as study, while academics in non-research-university is forced to be involved in more teaching as well as study than in research. Such policy of stressing separation between research side and teaching and study side has hardly brought about an idea of integration among them.

Current trend of continuing separation of research and teaching instead of their compatibility can be observable not only in Japan but also in the world as already shown in the international surveys so that it is assumed to be difficult with regard to realization of R-T-S Nexus as an ideal of higher education in 21st century (Boyer, 1990; Humboldt, 1910; Clark, 1997; Arimoto, 2008, 2011, 2014, 2016). Degree of difficulty in realizing of R-T-S Nexus is highest in the Japanese academics, even though it is becoming higher in the academics worldwide owing to their increasing research orientation.

a. Research orientation with a focus on Japanese case

In Japan, academics' research involvement has progressed intensively for more than a century since the prewar time until today, while their educational involvement, especially teaching involvement, has progressed slowly for the almost equivalent years. In the former, the academics imported the chair system from Germany and transformed it to the Japanese type chair system. Nobel laureates have been produced thanks to this kind of Japanese chair system considerably to the extent that they have been counted as many as 22 in the field of natural sciences such as medicine and physiology, physics, and chemistry by 2016, indicating the first ranking in the Asian countries.

Positive side of the chair system is observable in the fact of Nobel Laureates production in Japan as shown in the fact that all Nobel laureates (100%) were graduates from the national universities with the chair system. Among 22 laureates, 16 laureates (72.6%) were graduates from *Teikoku Daigaku*, the former imperial universities.

However, compared to the department system developed functionally for the promotion of science and scholarship in the U.S., the chair system was considered to be dysfunctional for the equivalent promotion of science and scholarship. As a result, the chair system was to become fateful abolition in 2007, after 114-year succession from Meiji period when it was institutionalized in 1893 into *Teikoku Daigaku* (Terasaki, 1973; Arimoto, 2017a, b).

On the other hand, in the latter, or negative side of the chair system, an intensive reform for the sake of emphasizing teaching orientation has been delayed in Japanese academia because of research paradigm's prevailing with reinforcement of the chair system and the quasi chair system intending to imitate the chair system.

b. Impact of research paradigm and reward system

A reward system including various kinds of award systems has promoted and protected research orientation as well. Various kinds of awards became a symbol of research orientation, because prestige of distinguished academics as well as institutions together with gathering a lot of awards was reinforced due to course by obtaining various kinds of awards including Nobel Prize which was functioning as a sort of almighty power among many prizes. Research orientation was strengthened more and more throughout the world to the extent that this phenomenon was called as "research paradigm" recognizable not only in Japan but also in the U.S. For example, Provost Stephen Goldfield said about the tremendous effects of Novel Prize winning in Princeton University as follows:

> "It helps in recruiting undergraduates, it helps in recruiting graduate students, it helps in recruiting professors and keeping them, it helps in fundraising, it helps politically." (Axtell, 2006, p.100)

University has plunged into the age of research paradigm since 21st century in accordance with emphasis on research productivity in emerging globalization society as well as knowledge-based society

c. Status of Japanese universities in the world university ranking

University ranking was partially introduced in the U.S. academic marketplace in 1925 and generally introduced into the academic marketplace nationwide in the U.S. in 1960's, having become popular today (Arimoto, 1981). The same kinds of trends of making university ranking have been broadly recognized in many countries other than the U.S. in 21st century.

For example, we can indicate a global university ranking system including the Academic Ranking of World Universities (ARWU), the World University Rankings by Quacquarelli Symonds (QS), the Times Higher Education Survey (THE). Subsequently, the ARWU, QS and THE have established themselves as the three global rankings of significance, or The Big Three (Downing & Ganotice, 2017, xxi). They are making a great deal of pressure on a lot of universities, particularly on research universities in the world, in light of their becoming successfully what is called as world class universities.

The trends have had strong effects upon universities worldwide so that they have to respond to the increasing pressure expecting them for climbing up to the top of pyramid of the world class universities (Downing & Ganotice, 2017, pp.28-32). Jung Shin pointed out university's functional differentiation toward three types such as world crass university, national level university, and local university (Shin, Arimoto, Cummings & Teichler, 2014).

In the U.S. a phenomenon of word class university is increasing, causing transformation of university from "institutional leaning" to "world class discourse" (Meyer, 2017, p.22). Dominant mode of discourse is now changing from "conversation to competition" (race to the top) and reputation formation is also changing from "peer review to ranking". This trend of paradigm transformation started in 19th century when the U.S. imported ambitiously German model including Humboldtian model developed well into the center of leaning in the world at that time. Based on the successful importation of German model, the paradigm transformation has been increasingly prevailing in the U.S. and its output has been reflected manifestly and latently on driving force working behind the world university ranking movement.

Both Japan and the U.S. launched out for making their own academic productivities consisting of research, teaching, and service productivities, by importing German model in 19th century, bringing about their different developments until today, especially in reference to those of the world university ranking: as many as 70% of top 100 ranking universities was occupied by the research universities in the U.S, while only 2% was occupied by the counterparts in Japan (Times Higher Education, 2014; Arimoto, 2015a). One of the most important reasons for it may be caused by the fact that the

universities in the U.S. were used to participate as a form of preliminary exercises in the domestic competitive market mechanism in terms of university ranking before participating in the global competitive market mechanism. Accordingly, it is likely to be difficult for Japanese academics to catch up with in a short period the U.S. structure which has been formed step by step for long time by American academics.

5. Possibility of the AP's R-T-S Nexus

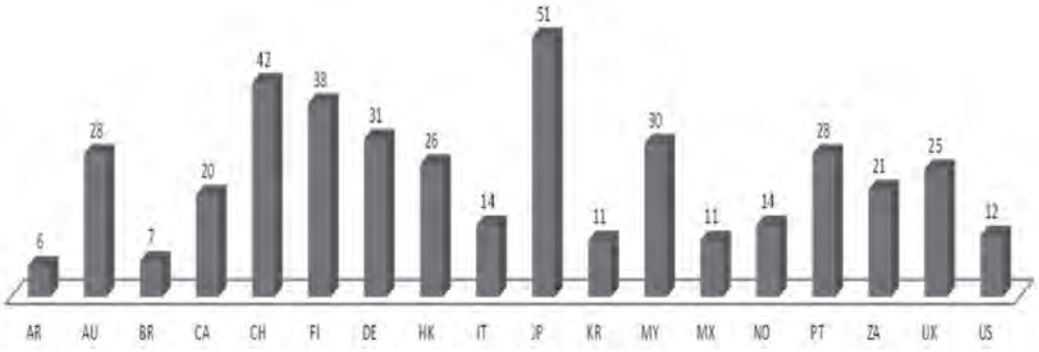


Figure 5. Teaching and research are hardly compatible

As described previously, R-T-S Nexus has not been realized at all in Japan as well as in the world for more than a century before and after World War Ⅱ. As the 2007 CAP survey clearly realized, the proportion of academics overall who did agree with the statement that "teaching and research are hardly compatible with each other" was 25% in the advanced countries and 20% in the emerging countries (Figure 5).

Probably it will be hardly realized in the near future in Japan mostly owing to the negative consciousness peculiar to Japanese academics (51%) according to Figure 5 related to the same question of "teaching and research are hardly compatible each other" which was asked to the academics in the other participating countries. In other words, academics who conformed positively to compatible teaching and research recognized negatively the equivalent alternative in the CAP survey conducted in 1992.

In this context, there are some problems to be dealt with carefully so as to resolve the present situations of difficulty for realizing R-T-S Nexus. In other words, the problems consist of three parts: Overcome of prevailing research paradigm; Realization of AT (Active teaching) for AS (Active study); Response to negative symptom of student attitude toward study.

(1) Overcome of prevailing research paradigm

Considering possibility of the AP's R-T-S Nexus in the teaching and study process, how to bring the prevailing research paradigm under control is likely to be indispensable. In this context, prevailing research paradigm is not useful in the teaching and study process, because it is apt to deny the functions of both teaching and study. Accordingly, academics are required to guarantee research even in the teaching and study process to realize that research will become a basis on which both teaching and study can function each other successfully. Without this guarantee, academics' discovery and invention gained in the most advanced research cannot be connected to their own classes so that it is difficult for academics to construct the teaching and study process to the level that will bring about development of student's active study leading to academic ability such as creativity, problem solving, problem discovering, critical thinking, etc. (Arimoto, 2013).

How to overcome a sort of pit caused by research paradigm, which is sorely involved in R concentration level, and how to create R-T Nexus level and finally R-T-S Nexus level is asked to realize sufficiently.

(2) Realization of AT for AS

Therefore, in the 21st century, various kinds of concepts and equipment for AT and AS formation will not developed successfully without paying much attention to a perspective of the teaching and study process in the context of academic's professionalization in relation to R-T-S Nexus realization. For example, following are some of concepts and equipment related to promotion of student's active study: Syllabus, CPA, CAP, credit, strict evaluation, office hour, monitor system, tutorial system, numbering of subjects, rubric, debate, discussion, Socrates method, portfolio (teaching portfolio, learning portfolio), evaluation of teaching by students, etc.

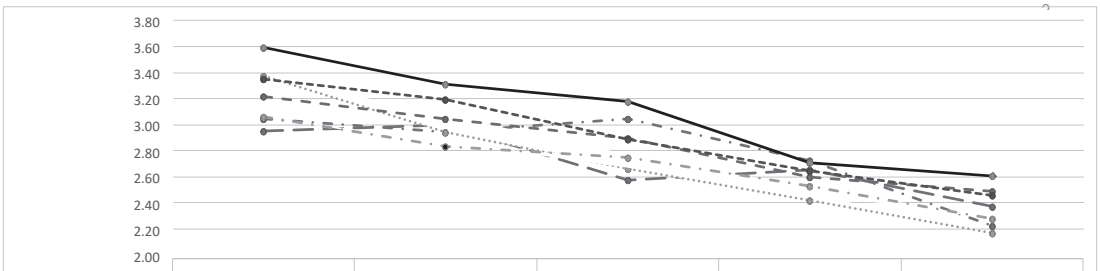
(3) Response to the negative symptom of student attitudes toward study

Based on the results obtained from the considerations to the past several international surveys, how to construct the strategies valuable to the next stage is important problem to be discussed from now on. In this context, the U.S. model may be useful for the Japanese academics to catch up with since they have paid much attentions to construct it for many years during the postwar time.

Not only MEXT but Japanese academics as well as academia have been importing a series of models of the academic reforms mostly from the U.S. for seventy years since World War Ⅱ, though it is likely to be difficult for Japanese academics as well as academia to conform to climate and culture particular to American model. For example, academics' attitudes for compatible research and teaching are American model that is different from German model to which Japanese academics have made conformity constantly as described previously. German model is different from Anglo Saxon

model to which American academics has made conformity constantly.

Japanese students' attitudes for preparation study to classrooms are insufficient in terms of active study in spite of having imported American way of active study as a textbook in Japanese universities and colleges. As far as R-T-S Nexus is concerned, both Japanese academics and students are still desired to be improved in light of active teaching and active study.



	Attend steadily to less-interesting class	Make utmost effort to get good achievement	Attend actively to GW and Discussion	Ask and consult teachers how to study	Attend class after preparation and review of lessons
MB	3.07	2.96	3.07	2.75	2.25
ES	2.98	3.02	2.60	2.68	2.39
NM	3.40	2.97	2.69	2.44	2.19
HS	3.24	3.07	2.92	2.62	2.51
N	3.62	3.33	3.20	2.73	2.63
SW	3.09	2.86	2.77	2.55	2.30
CW	3.37	3.22	2.91	2.67	2.48

Figure 6. Student attitude toward study

In this context, it seems to be useful to discuss our findings in a recent survey conducted in a small private university with 2,000 students in Hyogo prefecture in 2018. Students belonging to seven departments replied questionnaire sent to them with 95% return ratio. As a result, most important finding is that R-T-S Nexus was not working. There were five questions asking student attitudes toward study as follows: "Attending steadily to less-interesting classes"; "Making utmost effort to get good achievement"; "Attending actively to GW and discussion"; "Asking and consulting teachers how to study"; "Attending classes after preparation and review of lessons". This order of five questions exactly indicates student's average scores in the order from top to bottom regarding their answers to questions, revealing no transformation from a traditional type of learning to an innovative type of study which is expected to be made for realizing R-T-S Nexus.

Students' responses to our questionnaire of "Attending classes after preparation and review of lessons", which is a core requirement of American credit system we imported in japan as a text almost seventy years ago immediately after World War Ⅱ. Contrary to our expectation, students' responses revealed only small average scores, from 2.19 to 2.63 (amid the average scores from minimum 1.0 to maximum 4.0) according to Figure 6 (Arimoto, 2018b). The results mean students' insufficient

preparation and review of lessons so that academics' involvement in academic productivity leading to active teaching is still desired to be introduced to encourage students' active study.

(4) Promotion of AP's involvement in academic productivity and R-T-S Nexus

In this structure, academics have a difficult problem how to promote their academic productivity including three areas such as research, teaching and study in relationship to actualization of R-T-S Nexus. Expectation to the Japanese AP from an idealistic viewpoint based on Humboldtian idea has intensified leisurely its involvement in both academic productivity and R-T-S Nexus, even though Japanese academics have been involved intensely in different direction to such idea.

a. National trend vs local trend

However, present situation of R-T-S Nexus has not realized an ideal state of compatible research and teaching, resulting in much development of research orientation and less development of active teaching and study orientation. In this context, declining academics' teaching ability has necessarily developed declining students' study ability, especially their less transformation from the traditional stage of leaning to the innovative stage of study.

Contrary to this national level trend of strong research orientation in Japanese academics in light of rather mild research orientation in academics in the world as recognized in a series of international surveys including Carnegie and CAP, a new trend of the AP's reaction to compatible research and teaching is emerging as shown in the following case study of academics' leadership in Japan. A questionnaire survey was conducted in 2017, 2018 and 2019 to the academics in H University as the same institutions in which questionnaire surveys were also conducted to students described preciously. Among 120 academics return ratio was 40% from the four faculties and seven departments according to the results of 2017 survey (Arimoto, 2018b, c).

The questionnaire related to the main theme of academics' leadership was focused on academics' orientation to both research and teaching. It is interesting to recognize that academics' teaching orientation was stronger than research orientation, although it is quite different from Japanese academics' strong research orientation as testified successively in a series of international surveys (Cf. Figure 3 based on CAP survey). One of the most remarkable findings of academics' responses was that an inclination of academics' responses conforming to teaching orientation was different from an inclination of students' responses expecting academics' much more research orientation than teaching orientation. As a result, it is not deniable that there is a sort of discrepancy between academics' actual situation of teaching orientation and students' expectation to academics' research orientation.

This academics' new reaction against research orientation is likely to be preferable in a sense that they are making a commitment in strong conformity to teaching rather than strong conformity to

research. However, it is considered to be very problematic from a viewpoint of constructing academics' educational leadership along with R-T-S Nexus model which is demanding compatible research and teaching. Academics' successful realization of students' active study commitment is not likely to be realized by academics' intension of conducting only teaching function without any intension of conducting research function.

b. Research orientation: Its positive side and negative side

Although there is new trend of conforming to teaching more than a traditional trend of conforming to research as shown in the case study discussed previously, it is recognizable that a main stream of Japanese academics' reaction to the former and latter trends has been made by their intensive commitment in the former, or research orientation, for many years during the prewar and postwar time. Strong research orientation has caused a positive trait such as high production of Nobel Prize winners which was probably accompanied by the rising trend of academic productivity in academia, especially research productivity, for more than a century from the prewar to postwar time.

Nevertheless, the present situation of academic productivity, in particular research productivity, which has developed constantly under the prevailing research paradigm for long years, has been revealing undesirable phenomena such as declining international competitiveness in research productivity in terms of decreasing number of papers and citations (Saka & Kuwahara, 2012; Arimoto, 2015b). The reasons for such symptom are considered to be related mostly with the national government's policy of corporatizing national universities in 2004 and also its policy of introducing the revised school education law into the universities and colleges in 2015 (Arimoto, 2015a, 2018d).

The former has brought about great damage to the national university corporation by 1% cut of "operating expenses grant" (*uneihi kofukin*) every year from 2004, making as many as 14.0 billion yen decrease for the level of whole national university corporation during 10 years from 2004 to 2014. As a result of such shortage of grant, many universities are forced to lose numerous academics mostly caused by not recruiting new academic staff for replacing with many retired academic staff due to mandatory retirement age and other reasons. Decreasing academic staff have inevitably provided the academics, who are still working in the same institutions, with shortage of time, or time deterioration, spearing for the sake of research, teaching and service. It has necessarily extended a great deal of damage to declining academic productivity including research productivity, teaching productivity and service productivity.

The latter has also brought about great deal of damage to a lot of universities by introducing a top-down type governance and administration abolishing the faculty meeting's right of decision on the basis of autonomy which had been lasted for a long time.

Through these kinds of thoroughgoing reforms, it is clearly observable the national government

intended to make university's transformation drastically from bottom-up to top-down style of governance and administration.

c. Teaching orientation in relationship to R-T-S Nexus

The present situation of declining teaching productivity is going together with academics' declining teaching ability as shown in less transformation from traditional teaching to active teaching and also together with students' decreasing achievement ability as shown in less transformation from passive learning to active study. This kind of trend is recognizable despite academics' consciousness have been changed in the small private universities as testified in the case study discussed previously. The reason for it is mainly consisting of academics' insufficient preparation for teaching in classrooms as the result of time deterioration previously mentioned.

It is also consisting of student's decreasing literacy and competency caused by students' super diversification peculiar to universalization of higher education development stage. Phenomenon of students' decreasing abilities is increasingly observable in the border-free universities, or a kind of open-door-universities, as well as in the middle high schools (Kuzuki, 2017).

The university is thought to be quite different from professional schools and middle high schools, and even from the border-free universities in a viewpoint of its integration of research, teaching and study on the basis of research, or inquiry, as described in the framework of this article. The university has to give up its own original identity without conforming to research or inquiry culture leading to R-T-S Nexus as was discussed by Burton Clark.

> "A culture of inquiry has advantages in a wide educational sites, since, from the secondary degree to the doctorate, graduates increasingly needed habits of mind necessary for informed and disciplined problem-solving. Thus it is crucially important in reforms that "the university" be seem first of all as a place of inquiry. The concept of the research-teaching-study nexus offers some firm ground for the inquiry model, pointing sharply to how one university sector after another uses close encounters with research both as a powerful way to teach and as an engaging way to stimulate student motivation and enhance learning."(Clark, 2007, p.281)

The AP is now expected to be promoted to genuine AP status other than quasi AP status through promoting academic productivity including a perspective of R-T-S Nexus as ideal of the AP in modern academia, even though academics in Japan and in the world as well are now confronted with a lot of difficult problems preventing them from promoting to genuine AP inside and outside academia.

6. Concluding remarks

There is a hypothesis that R-T-S Nexus should be developed in accordance with an ideal of modern university constantly since its proposition by Wilhelm Humboldt in 1910. In this historical context,

this article attempts to shed light on the given theme "An International and Comparative Perspective of the Academic Profession's development with a focus on R-T-S Nexus" by making analysis of the results gained from the past international surveys of the AP.

First, in the reference to the framework, academic productivity has an intimate relationship to Humboldtian concept of R-T-S Nexus dealing with it under the broad concept of science just like German concept of Wissenschaft. Humboldtian chief concept is what may be called "the three unities" according to Heinz-Dieter Meyer.

Second, various kinds of discussions have been made on the international comparative studies such as Carnegie, CAP, APA and APIKS (STEM) from a perspective of realization of R-T-S Nexus in the AP's academic productivity. As a result, among three basic models related to academics' involvement in R-T-S Nexus, which were obtained originally from the Carnegie survey, the compatible research and teaching model, or Anglo Saxon model, was considered to be closest conceptually to R-T-S Nexus model.

However, the most recent surveys such as CAP and APA (and perhaps APIKS) revealed clearly the fact that academics worldwide were involved strongly in concentration to research orientation, or German model, which was apparently contrary to the concept of compatible research and teaching.

Third, as far as Japanese case study is concerned, the national policy of stressing research orientation has been worked for many years to admit in academic's consciousness that research-university sector is superior to teaching-university sector. This doctrine has been intensively internalized in the AP's consciousness in the almost all universities and colleges to the extent that realization of research orientation has been successful in the prewar and postwar time, while realization of the ideal of R-T-S Nexus has been hardly successful.

Fourth, Humboldt's "the three unities" have not been realized in Japan as shown in the fact as follows: R-T-S Nexus has not been institutionalized in academia and also has not been internalized in academics as well; Integration of scientific discovery and moral formation ("building") was not successful due to fragile liberal education (general education) since 1993 when many faculties of general education were abolished by higher education policy; Realization of scholarly autonomy and scholarly community has been declined by the effects of the revised school education law introducing top-down governance and administration against academic freedom.

The idea of "the three unities" has been realized to a considerable degree for a century in the AP in the U.S. fairly differently compared to the counterpart in Japan. Even so, it is interesting for us to know the fact that the U.S. is now likely to be changing from successful development in accordance with Humborldtian ideal to the unsuccessful outcome according to Heinz-Dieter Meyer (Meyer, 2017).

A series of facts discussed here in this article will predict difficulty of realizing R-T-S Nexus in academics in japan and also in the world in the near future. In this context, it is interesting to make analysis of the results to be obtained before long by the APIKS's survey on the AP in the world.

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