“Education in the time global competition”

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Part 1. The present situation of decline in the scholastic ability of students in Japan, and appropriate educational system to break this situation

Chapter 1. On the Values of Education

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Kyoto University

Unfortunately these days, the academic level of students in Japan has been going down, even compared with the figures of other advanced nations. In our country, students are subject to learn under the same curriculum regardless of their differences in achievement, so that talented students are often deprived of their chances to learn more and to be more competitive.

In terms of proficiency in foreign languages in particular, our hearing skill is said to develop to the full by the age of 10 or so. A one- or two-year-old boy who spends only a short period of time in a foreign country will be able to master the language in his later years more easily than those without the background, even close to the level of native speakers' in their hearing and pronunciation. For any one of us, learning capacity is shaped at a very early age, and the same is true with our ability of logical thinking, which develops as we are studying mathematics.

Profound thinking and creativity – we know these qualities cannot be judged merely with regular paper tests. To be sure, some students are talented in aspects that are not measurable simply by written tests. However, we have technically no more accountable method of evaluating children than that old set of standards at the moment. As we have so many colleges and universities in Japan, following the number in US, windows of opportunities are actually open for students who want to pursue their academic interest after leaving school. If they are so motivated, passing only one entrance examination of any academic institutes of their intent – that's all they have to do. Given the circumstances, it seems rather inappropriate to me denying the values of our written tests completely, insisting too much on evaluating hidden qualities and talents of students, which in my understanding is quite unlikely to be done properly.

In Japan, the word "Deregulation" is interpreted a little differently, with the meaning of an act of "relaxing," not "removing," restrictions and regulations. This rather vague and deceptive translation often misguides Japanese into some unrealistic framework of reference. Seen from our education today, our schools have spent so much time on classes of moral duty and obligation; ironically however, surveys show numbers of juvenile delinquencies and crime rates are increasing. These phenomena suggest a mounting disbelief among children in adults and repeated expressions, such as "value more the hidden talents and qualities," "value more the abilities to live and develop physically and mentally." Beautiful phrases as they may be, children are sensing the vanity and emptiness behind the rhetoric. We should stay away the fancy expressions and be more faithful to the minimum basic necessities; that is to say, leading them not to commit crimes, not to tell a lie, to be more considerate for others and be more diligent. These simple, but vital teachings of life will make a huge difference for children and further for our society.

Chapter 2. A Proposition for Making High School Students Capable of Comprehending the Concept of a Fraction as a Minimum Requirement for Entering Universities

Tsuneharu Okabe
Saitama University

In discussing the way of educating those children who will be responsible for the 21st century, the author, as one of university professors, does not think that it is ever an ignorable fact that a considerable number of university students cannot even understand arithmetic at primary education level. This is a problem concerned with the articulation between upper secondary schools and universities rather than with the education at elementary schools. The report, " Improvement of the Articulation between Elementary and Secondary Education and Higher education," issued by Central Council of Education early November last year, should be evaluated in that it makes mention of the above problem, the recent lowering in scholarship among university students, but its way of bringing the fact of lowering in scholarship into question should be criticized from the author's point of view.

Several researches on lowering in scholarship among university students, made public by major domestic newspapers and Kawaijyuku, one of the special preparatory schools for entrance examination, seem to basically confirm our view on that issue.

It is very doubtful, on the other hand, whether the opposite view about "lowering in scholarship", the denial of lowering itself, is founded on reliable facts.

There have recently been arguments among specialists in mathematics education about the definition of "scholarship". This paper also includes discussion on that issue.

Chapter 3. Facts and Fibs in Japanese Education

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Discussions about Japan's educational system and its problems have strayed far from reality. To get back on the right track, we need to look deeper and more candidly at the issues.

Firstly, I present basic educational data about Japanese elementary and middle schools, and show that the quality of education is gradually deteriorating. The subjects taught in schools have become easier, and the number of subjects in university entrance exams has declined. In international comparisons, the scores of Japanese youth have worsened in mathematics and English.

Secondly, I show that the quality of higher education in Japan continues to decline, reflecting the deterioration in the quality of education at middle schools. Until recently, Japan was applauded for the high quality of education at its elementary and middle schools, but a closer look shows that the educational system can no longer maintain these high standards. Further, Japanese universities rely on difficult entrance examinations to establish a learning standard, but they do not try to educate their students in any serious fashion once those students enter the universities.

Finally I present my conclusion, namely that Japanese universities must take the lead in defining the issues and addressing the problems, and thereafter help society achieve its educational goals.

Chapter 4. Math Education in Japanese Universities in Crisis

Yukihiko Namikawa
Nagoya University

In Japanese universities they say that the education of mathematics has been collapsed. The collapse occurred in all areas of mathematics education.

First in college level the number of math courses for students of non-scientific majors is decreasing drastically, hence they graduate universities with very poor or even less knowledge of mathematics. This applies also to other scientific subjects such as physics.

Next even freshmen in scientific majors have no enough ability to learn basic mathematics such as calculus or linear algebra since the level of math education in high schools is too low. What they have learned was not how to think in mathematics but only how to remember formulas and theorems. As a result they don't understand mathematical methods such as logical reduction and abstraction.

This applies also even to students of math majors or to math graduate students. Therefore we should change our curriculum of mathematics so that students can understand what is mathematics and how one thinks in mathematics. We should consider also practical application of mathematics.

Concerning math education for scientific (but non-math) or engineering students we have a problem of mismatch between basic math education and that of their majors. To overcome this problem we can give, in math courses, basic important examples which they will learn afterwards. Similar problems exist also in informations and teacher educations.

Chapter 5. Why are many undergraduate students poor in scholarly ability?

Kenji Ueno
Kyoto University

In Japan many freshmen enter universities with non interest in science. Moreover, often they cannot understand what understanding means.

One of the main reasons of such phenomena is the entrance-examination- oriented education in high schools. This kind of education is supported by many parents. Their interest is for their sons or daughters to enter the famous universities. They evaluate teachers and schools according to the number of students to enter the famous universities.

Hence, in high schools students are taught how to solve the problems and to memorize the patterns of the problems. Teachers cannot teach beauty of science nor how the basic concepts of science have grown up. Therefore, many students cannot find any motivation to study, although they have many basic questions in their studies and eager to learn.

To change such poor education in Japan, teachers should study their subjects so that they understand the subjects better. Not only that, we need to create consensus that we Japanese should contribute to the

future of our world by solving the serious problems such as the environmental problem, which threaten the future of mankind. Once we have the consensus it is not difficult to change our education system so that in high schools true meaning and beauty of science are taught.

Chapter 6. The less course hours of Science and Mathematics will make Japan the less national activity and security

Ryoichi Matsuda
The Univ. of Tokyo

The present course of study for age 7 to 18 in Japan was designed to give pupils/students more free time to do whatever they want to do than the courses used to be. In the high school science course, all four major fields, physics, chemistry, biology and earth/space sciences were taught until seven years ago, however, it has been changed to teach only two of the four fields in the present course. Undergraduate students who studied only biology and chemistry in high school are having hard time to learn physics in the college. Students studied physics and chemistry are also having hard time to study biology in the college. Now, professors have to teach science and mathematics at the high school level to undergraduates. The next course of study starting from 2003 was determined, without any evaluation of the present course, to go even less study hours than the present course. The total hours of studying become less than 2/3 of the 1960's. It is anticipated that the less study hours of science and mathematics in younger generation will make lower the industrial activity and eventually less national security of Japan.

Chapter 7. Scientific education at universities and high schools at issue today

Haruhiko Masaki
The University of Tokyo

The academic achievement of university students has declined in these years, owing chiefly to the preference-based learning and reduced educational content in the secondary schools, which was adopted according to the current Course of Study. This tendency must be accelerated by the next Course of Study enforced from 2002 or 2003 on. The actual state of university students, however, betrays Monbusho's intention to help children acquire well-balanced abilities and grow their individuality with plenty of scope. Universities are logically not responsible for this issue, which should be feed-backed to the present reform of the secondary education for the sake of the students in the ten years future.

On the other hand, present universities, which receive such immature students, are unfortunately in the worst circumstances to pursue and improve their own education. Most university teachers are concerned more with their own research than with education, because they are evaluated only with their research abilities when they are employed or promoted. Evaluation of education in universities is thus urgently needed.

I made following two other practical proposals to improve (1) the educational conditions of universities and (2) the proper connection between high schools and universities. (1) Reform of university grades for undergraduates and master-course students from the present "4+2" structure to "3+3"

to make both courses more solid and fruitful. (2) Introduction of a comprehensive entrance examination to university, to ensure the students' abilities to cover broad range subjects, which is important to further development of scientific abilities.

Chapter 8. What Problems are involved in Current Educational Reform in Japan: Are their Goals Attained or Failed?

Takehiko Kariya
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The Ministry of Education announced that about 30 percent of the contents of national curricula from elementary to senior high schools will be reduced from the year 2002. The main goal of this reform is to give school children more "YUTORI, " time for themselves. In this chapter, we examine how much today's children lack their own time and to what degree they suffer from pressure from "exam hells" by focusing their study hours at home.

From analyses of several survey data, we find that unlike the reformer's statement, current school children in Japan study fewer hours than before and the difference of study hours tend to increase among different socio-economic groups. The analysis also indicates that despite the decrease of contents of national curricula for the last two decades, students' understanding of their school works has not improved.

From these results of analyses, we conclude that current educational reform does not produce good outcomes, rather it is very probable that reform even contributes to declining the academic achievement of Japanese children, and we predicts that the situations will be more worse unless reformers notice what problems are involved in current educational reform based on empirical analysis of educational achievement.

Part 2. The present situation of higher educational system and its circumstances

Chapter 1. Utilization of Flexible Entrance Examinations and Changes in Teaching Methods on Core Subjects - A Case Study on the Private University A

Junichi Hirata
Ritsumeikan University

In recent years, especially in 1990's, a lot of universities in Japan reduced number of subjects for their entrance examinations. In this paper we evaluated how those changes made effects on university education especially core subject in economics departments, such as the introductory micro-economics, the introductory macro-economics and the basic mathematics for economist. Throughout this paper we took the private university A as an example, because it is believed this university has been most active introducing new types of entrance examinations.

Firstly, we summarized how economics department of the private university A adopted various types of entrance examinations since 1983. We realized that the university started to introduce new type of entrance examinations since 1989.

Secondly, we divided students in two groups whether they took mathematics a subject for their entrance examination or not, and evaluate their grades in core subjects. In all three subjects, students who took mathematics in entrance examination got better grade than students who didn't take mathematics.

Finally, we summarized how core curriculum of the economics department has changed according to this background differences in students.

We believe necessary basic knowledge for students who study in economics department is not restricted to mathematics, so we would like to continue this kind of study for other subjects in entrance examinations and other basic subjects in economics department.

Chapter 2. An Empirical Study on the Maintenance of High School Academic Achievement Levels of University Freshmen

Naoki T. Kuramoto
Tohoku University

The present article is based on two former studies, which assessed the high school academic achievement levels of university students after one year from the date of the actual entrance examination by using JFSATs (Joint First Stage Achievement Tests) and NCTs (National Center Tests). JFSATs and NCTs, reformed version of JFSATs, are designed to evaluate the levels of basic academic achievements acquired in upper secondary schools, and their scores are used for university admission decisions. Over 1,600 participants' scores of monitor examinations for JFSATs and NCTs, which covered 8 school years, were merged to and compared with the achievements of the former year of their own. The results showed that the statistically significant decline of achievements was observed in almost all of the academic subject areas, even though regression effects were taken in account. The decline of Social Studies and Natural Sciences seemed more serious than that of the Japanese Language, Mathematics and the English Language. One of the most important trends of change was that the preexistent group differences between students of the art courses and the science courses were enlarged. Some of the results suggested that it would be important to encourage high school students to cover broad academic areas rather than to specialize in subjects according to their preferences.

Chapter 3. Education in France and in the United States -- From the point view of a mathematician

Nobuyuki Tose
Keio University

The aim of this paper is to report about the educational system in France and in the United States. We pay a special attention to how the admission process to universities is done in the both two countries. In France it is compulsory to pass the examination Baccaraureat in order to enter universities. In the United States the achievement test SAT level 1 is compulsory, which ensures the both literal and numeral competence of students. Moreover to enter competitive universities, the higher leveled SAT

level II of several subjects is required. More important is to note that all universities have their own requirement about the high school subjects to take, and the grade of those subjects is considered to be important in the admission procedure. To the contrary, Japanese universities, in particular private universities are accepting many badly prepared students through the entrance examinations of few subjects without mathematics.

Chapter 4. A Comparative Study of Educational Opportunities and Socio-economic Returns to Education

Hiroshi Ishida
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This study examines the effect of social background on educational attainment and the impact of education on socio-economic attainment in Japan, Britain and the United States. The analysis of educational attainment reports that educational opportunities are not open to all the members of the society and that people from privileged social backgrounds have better access to educational resources. The analysis of socio-economic attainment shows that the relative importance of education is less pronounced in Japan and that socio-economic returns to education are not necessarily larger in Japan than in Britain and the United States. Educational credentials tend to have a long-lasting effect on the occupational attainment process in the United States and Britain whereas in Japan the effect of education is maximized at the entry position. The analysis of elite formation shows that the educational origin of elite is more concentrated in Japan and Britain than in the United States. The cross-national difference in socio-economic returns to education and the effect of education on elite formation probably reflects the difference in educational institution and the labor market structure among the three societies.

Chapter 5. Increasing Scarcity of Problem-solving Skills under the Rapid Technological Development

Hiroyuki Chuma
Hitotsubashi University

The main purpose of this paper is to clarify what types of skills embodied by production workers has increased their scarcity under the rapid technological development. Specifically, we try to clarify this point based on the intensive field research about the two stamping shops in the automaker A and its subsidiary auto-parts maker. The research was conducted two times (3 hours at one time) for each person of each shop.

The respondents were group leaders who have 6 to 8 subordinates and skilled workers with 10 years of tenure. The result says that the key skilled workers must have the following characteristics: a)rich experience about various kinds of troubles, b)appropriate knowledge about iron materials, molds, and stamping machines, and c)rapid problem-solving ability that make it possible to find out causes and effects of unknown troubles in question based on the appropriate logical thinking. In particular, we confirmed that the scarcity of problem-solving ability has been increased under the rapid technological development

symbolized by the word "Digital Revolution."

Part 3. Appropriate educational system for English

Chapter 1. A Trump Card for Internationalization---Implementation of English Language Education in Elementary Schools as a Regular Subject

Katsutoshi Ito
Kanagawa University

English language education will be implemented as part of ‘education for internationalization’ at public elementary schools in the framework of ‘総合学習の時間’ (time for general education)from 2002.

In this chapter, I will first present a brief history of foreign language education at primary school level abroad as well as in our country. I will, then, discuss the significance and purposes of foreign language education in elementary schools from five viewpoints.

An overall picture of the structure of English Language Education from primary school to university will be presented toward the last part of this article. I look forward to the day when foreign language (English) will be implemented as a regular subject at all elementary schools in Japan.

Part 4. Appropriate educational system based on an analysis of psychology

Chapter 1. A criticism of the recent educational 'reform' from the viewpoint of the Theory of Multiple Intelligences

Masuo Koyasu
Kyoto University

Howard Gardner's (1983) Theory of Multiple Intelligences has proposed that there are seven intelligences; linguistic, logical-mathematical, musical, bodily-kinesthetic, spatial, intrapersonal, and interpersonal intelligences. Each of the seven intelligence modules are relatively independent of each other, and this is supported by several facts. Firstly, there are breakdowns specific to a module, such as speech disorder or other cognitive disorders. Secondly, there are many precocious children who are talented in music, chess, or some other specific area. Thirdly, there are so-called idiot savants who are talented in some tasks, though they are generally intellectually handicapped.

From the viewpoint of Gardner's Theory of Multiple Intelligences, we can propose several types of education, such as special education for gifted children, compensatory education for the handicapped, individualized education, and all-round education. Special education for the gifted and compensatory education for the handicapped may be all right, but a formal education system should adopt an all-round type of education. An individualized education usually suffers from the adoption of an *à la carte* approach to curriculum and examination subjects. Students in such a 'cafeteria curriculum' tend to avoid difficult subjects such as mathematics, sciences, and foreign languages. An all-round education, while

preferable, should avoid the uniform evaluation of students and recognize differences.

Chapter 2. A School Education System on Adlerian Psychology

Shunsaku Noda

Alfred Adler and his students proposed a system of school education based on encouragement. Atmosphere of mutual respect and mutual trust between teachers and children should be established at first. Rewards and punishment are avoided and children are encouraged to experience the consequences of their own behavior. Rules of the school should be democratic and approved not only by teachers but also by children. Raymond Corsini established primary schools called “C4R school.” Children choose a class according to their achievement. The schools are managed on democratic simple rules. In Japan, many teachers begin to study Adlerian method of school education.

Chapter 3. Creating Quality Schools: The New Trend in Education

Masaki Kakitani

The movement to create Quality Schools is gaining momentum. So stated Dr. William Glasser in a speech in Boston presented in 1999. The pursuit of quality was originally emphasized by W. Edwards Deming, the father of the Quality Management movement. What Deming was trying to do is explained by the teaching of Choice Theory, which was formulated by Glasser. He was been inspired to adopt Deming’s idea of quality into education. Quality School training has proven to be effective and practical in its use. This article is an attempt to introduce key Quality School concepts.