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'Hensachi'

- A mysterious value that is of utmost importance to Japanese entrance examinations -

Kazuhito Komiya

In June 2012, I was appointed president of Chiba Institute of Technology by means of a faculty vote. This method of electing a president was later abolished at the Chiba Institute of Technology; thus, I am the last president elected by the faculty members of this institution.

My top priority, in keeping with my promise to the faculty members upon winning the presidential election, was to ensure that high-level students secured admission in the Chiba Institute of Technology. Specifically, I promised the faculty members that I would raise the Institute's *Hensachi*, which was low at that time. Having been elected as the president, I brought about educational reforms and directed the creation of a research system aimed at admitting exemplary students to the Chiba Institute of Technology. As a result, this initiative not only elevated the calibre of students enrolling in the Institute but also improved education and research and, eventually, the management of the institution.

Hensachi is a mysterious numerical value that is of utmost importance to Japanese students (and their parents and teachers). It is the focus of attention not only at universities but also in junior-high schools and

high schools; its relevance lies in the integral role it plays in determining whether students would be able to secure admission in their desired schools. *Hensachi* is a value that indicates where a student stands in a mock exam relative to other students having attempted the same test. The mock exam is conducted by a private preparatory school. *Hensachi* can be expressed by the following equation:

$$Hensachi = \{ (A - B) / C \} * 10 + 50$$

where, *A* is the subject's mock exam score, *B* is the mock exam average score, and *C* is the standard deviation.

Statistically, a *Hensachi* value of 50 is considered an average score, whereas scores of 60 and 70 place students among the top 15.9% and 2.3%, respectively. Therefore, *Hensachi* is a guide positing that a student desirous of securing admission to a top-class university must have an exam score of 70 or more whereas, conversely a low *Hensachi* of 30 marks qualifies a student for universities with lower requirements for securing admission.

In calculating *Hensachi*, it is assumed that the cumulative scores of all high-school students who take the mock exam will result in the formulation of a normal distribution. Therefore, *Hensachi* loses

statistical relevance in mock tests with skewed distributions.

In Japan, three main institutions conduct mock exams for high-school students: Sundai Preparatory School (Sundai), Kawaijuku and Benesse Corporation (Benesse). While Sundai accounts for about 70,000 test-takers, Kawaijuku and Benesse cater to about 350,000 test takers each. Sundai's mock exam is intended for students aiming trying to secure admissions to high-level universities; therefore, it attracts fewer test-takers compared to Kawaijuku and Benesse. Many students also take these mock exams from several other prep institutions. These exams are voluntary, allowing students to gauge their academic abilities and determine which university they should apply to. Thus, the results of these practice exams are never used for college entrance exams. These mock exams are neither nationally recognised tests conducted by the central government for university admissions selection nor entrance exams independently conducted by each university.

Moreover, over half of the Japanese high-school students secure admissions to universities through the recommendation method, wherein the university enrolls the student based on high-school grades,

etc. without requiring the student to attempt the university's academic ability test. Consequently, high-school students with superior academic ability are not necessarily enrolled in universities with high *Hensachi* values.

Table I illustrates the *Hensachis* of the Chiba Institute of Technology. These *Hensachis* are based on the 2019 Sundai, Kawaijuku Educational School and Benesse mock exams. In the practice test at Sundai, the ratio of high-level examinees to all the examinees is high, resulting in lower *Hensachi* scores for Sundai compared to those of Kawaijuku and Benesse even in the departments of the same university.

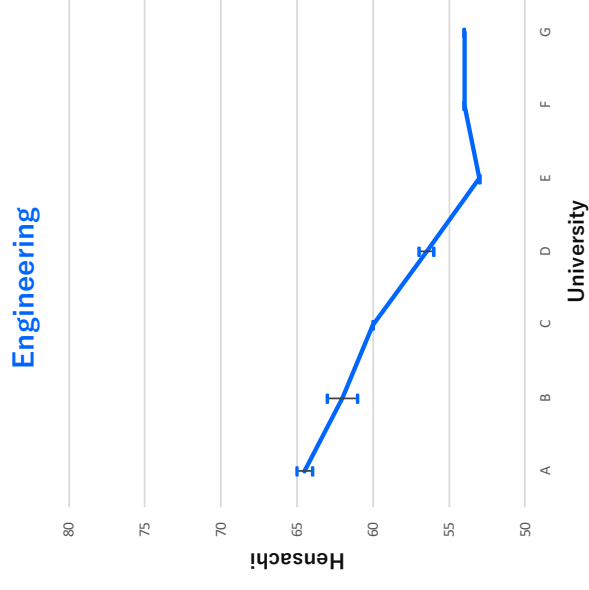
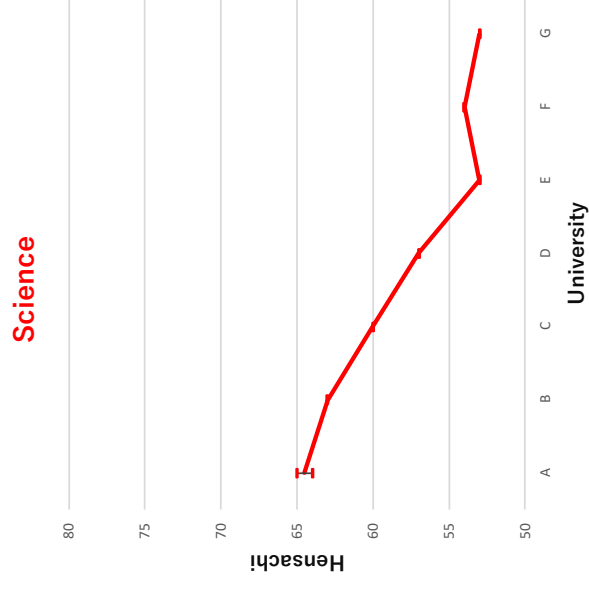
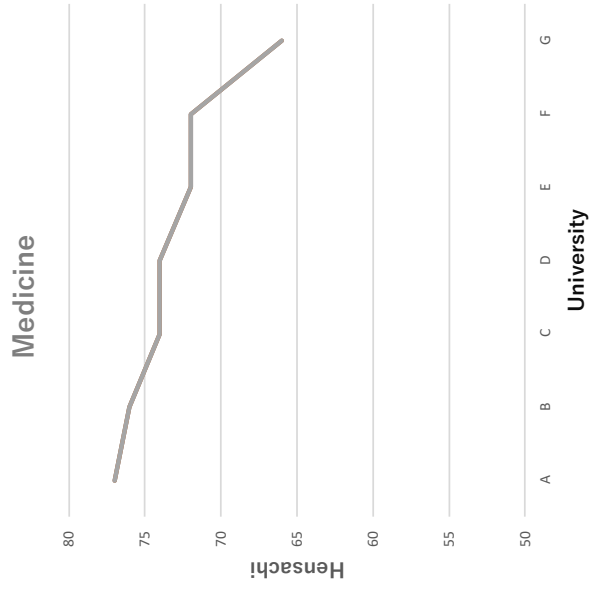
Table I

Faculties	Departments	Sundai	Benesse	Kawaijyuku
Engineering	Mechanical Engineering	41	56	47.5
	Innovative Mechanical and Electronic Engineering	40	56	45
	Advanced Materials Science and Engineering	—	54	42.5
	Electrical and Electronic Engineering	40	55	45
	Information and Communication Systems Engineering	40	56	45
	Applied Chemistry	41	55	45
Creative Engineering	Architecture	42	58	52.5
	Civil and Environmental Engineering	41	55	47.5
	Design	—	55	50
Advanced Engineering	Advanced Robotics	41	57	47.5
	Life Science	—	56	40
	Advanced Media	—	57	47.5
Information and Computer Science	Computer Science	40	58	50
	Information and Network Science	40	57	45
Social Systems Science	Management Information Science	—	53	50
	Project Management	—	52	45
	Risk Science in Finance and Management	—	51	40

Hensachi is only a relative evaluation of the examinees who have taken the same mock test. For example, if the scores of all the mock test-takers are 0, the *Hensachi* of all the test-takers is 50. If 80,000 of the 100,000 examinees score 100 points and 20,000 score 99 points, the *Hensachi* of examinees having scored 99 points will be 30. (The *Hensachi* of a person with 100 points is 55.) This means that *Hensachi* does not indicate the absolute academic ability of all university examinees. However, it can indicate which faculties or departments are popular among students.

Figure 1 compares Sundai's *Hensachi* with those obtained by students of other medical schools of top seven universities and science/engineering schools of the same universities for the year 2010. Figure 1 indicates that securing admission to medical school is more difficult compared to enrolling in the science and engineering department. This finding reveals that medical school—as compared to the science and engineering department—is more popular among Japanese high-school students. The lowest *Hensachi* of the medical schools of national universities was 60 for your information.

Japanese students, parents and high-school teachers focus on *Hensachi*



Figures I

when determining which university their children will attend, using the score to shortlist a university wherein the student is more likely to pass the entrance examination. In addition, if the student is eligible to pass this examination at multiple universities, parents typically look for universities with high *Hensachi* values, i.e. even those with scores of 0.1. As a result, in Japan, universities are ranked by means of a comparison between universities whose *Hensachi* values are set apart from each other by values as meagre as 0.1 points. From a scientific point of view, this is a very amusing fact.

The difference in *Hensachi* is determined solely by the scores obtained in the mock exam conducted by a private company and attempted by students on a particular day. Therefore, each child's *Hensachi* score is irrelevant to the standards of a university's education and research. Moreover, in the mock exam, all test-takers answer the same set of questions; however, in the actual college entrance exam, each university has its own unique exam. Therefore, the slight difference in *Hensachi* of the mock test is clearly a statistical error or variation and is therefore mathematically meaningless. Nevertheless, the tendency to decide which university to enrol in by looking only at the difference in *Hensachi*

values is a completely absurd phenomenon. While it is often said that Japanese people prefer meaningless rankings, the ranking of universities by *Hensachi* values is a cause of significant hindrance to the development of higher education in Japan.

People born from 1987 to 2004 received the education known as 'Yutori kyoiku' in Japanese schools. The term refers to stress-free schooling. For the Yutori kyoiku generation, the Japanese government reduced the curriculum requirements at elementary and high-school levels to reduce the students' workload and stress levels. Benesse, a private preparatory school, conducted a survey that compared the average amount of time high-school students spent studying at home in 1990 in the generation before 'Yutori kyoiku' to the amount of time spent by high-school students during the 2006 post-Yutori kyoiku' generation. The findings revealed that the average time fell by 6.3 minutes (from 49.5 to 43.2) for a mean score of less than 45; 27.2 minutes (from 89.2 to 62) for a mean score of 45 or more to less than 50; 51.8 minutes (from 112.1 to 60.3) for a standard score of 50 or more to less than 55; and 9.8 minutes (from 114.9 to 105.1) for a

standard score of 55 or more.

Hensachi compares the relative scores of students who have taken the same mock exam; therefore, it cannot unveil the differences in academic ability across generations. This is easy to understand by considering the fact that, in *Hensachi*, the average score is always 50 in both the era before and during Yutori education.

I believe that students' individuality is too often ignored in school education based on the *Hensachi* with an emphasis on admission to a university and Yutori education for minimising the dropout rates.

Even upon securing admission at universities, students are subjected to otiose general liberal arts subjects and academic education that is irrelevant to their future careers. In Japan, undergraduate engineering students must, immediately upon enrolling, take mandatory courses referred to as general education (liberal arts). These programmes focus primarily on the allied fields of humanities, social sciences and physical education, in addition to mathematics, science and foreign languages. These liberal arts courses account for as much as 25 per cent of the credits required for their graduation.

In Japan, students begin searching for jobs even while still in school, and many of them begin receiving offers as much as six months to a year before graduation. A university typically mobilises all faculty members and many staff members to support this process. It is quite common for students to be absent from class because of a job interview.

Japanese universities have little time to provide students with the specialised knowledge and the competencies they would require to survive in the global society of the future. Moreover, during the hiring process, companies also do not pay much attention to college education, instead assigning more importance to the high *Hensachi* value of the student's university than what the student may have learned in college.

I do not suggest that universities should cater to the talent companies' demands to resolve labour shortages. However, I believe that it is important for universities to understand that students must have the ability to identify future needs, define problems accurately and provide solutions. Currently, universities face many challenges inculcating such skills in students. First, the teachers only give lessons on what they want

to teach, not what the student wants to learn. Second, what teachers desire to teach the students is typically not commensurate with what students would require for their potential survival and growth. Finally, teachers may not impart students with all of the knowledge they possess, systematically teaching only certain aspects in a haste to complete a considerable portion of the syllabus within the allotted class hours.

These issues are not limited to specialised subjects. English education, for example, has not improved at all, although it is clear that many Japanese citizens' grasp of English is below that of other countries, which reduces Japan's international competitiveness. Thoroughly educating students in spoken and written English, in my opinion, is an issue that should be urgently addressed.

One lecturer who teaches English at a leading college in the United States says, 'Grammar is very important; however, I believe that grammar cannot be utilized unless the approach adopted by Japan is changed completely. The five-sentence pattern is unique to Japan. In the United States, we use up to three sentence patterns, but we do not teach 'sentence patterns'. The conventional teaching method imparts

to students that there has to be an object after the transitive verb. Also, I believe that the Japanese typically falter when translating grammar into Japanese and teaching it. English has to be translated in the mind because you cannot have a conversation without translating it in your mind. You cannot have a conversation if you do not understand the context in its entirety. English education in Japan provides very little exposure to conversational English. Even if I do not understand the details, I think I have to read and listen more. Writing and speaking cannot be done well without remembering many sentences. It works in the same manner as an artificial intelligence translator. There is no output without input! Grammar is the base, but I do not think anything will come out of it. As a guideline for the period of study abroad, reading and listening takes one year, and speaking and writing about three years. However, with special training, students will be able to speak and write a lot within a year'.

Is now the right time for university officials to discuss whether to pass or fail a student in the entrance exam depending on a difference of one point in the academic ability test? The crucial issue for a university is

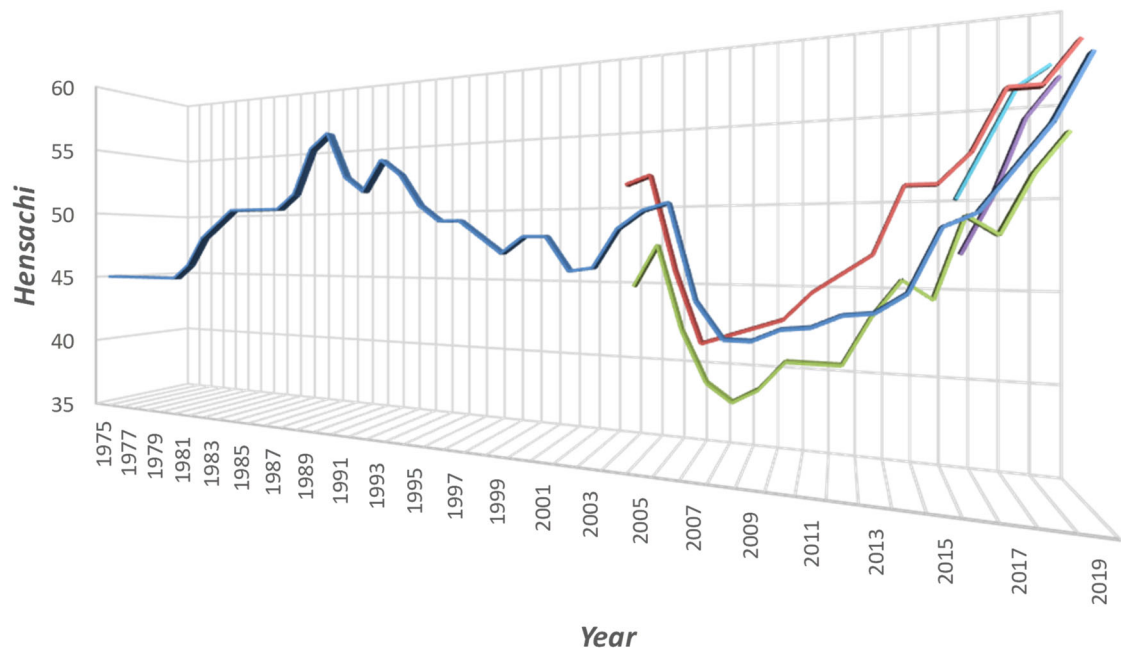
the type of graduates it produces. The university should be evaluated by the quality of its graduates. It is clear that the society of the future will continue to transform rapidly. In these changing times, universities must provide students with education that will empower them to direct their future lives.

However, due to *Hensachi*, Japanese education is moribund. No matter how hard the university tries to establish its own criteria, the hierarchy of the universities will hardly change because of *Hensachi*. Unless this existing social structure is dismantled, it will be almost impossible for a university to impart education that will produce a significant number of students who can direct the future. It is arguable that the root of many problems lies with *Hensachi*; therefore, I believe that changing the choice of university based on *Hensachi* is an effective solution, not only for the university, but also for the growth of Japanese society.

A Japanese woman who raised her two children from kindergarten to college in a public school in England says: 'When my child entered an elementary school in the UK, I thought, "What is this play-like, kindergarten-like elementary school!"' compared to Japanese

elementary schools. However, when the children became junior high-school and high-school students, I realised that the children who had studied in the UK had more independence and were more opinionated than the children who studied in Japan’.

Figure 2 shows the Benesse's *Hensachi* of the Chiba Institute of Technology from 1975 to 2019. It is clear that the *Hensachi* increased sharply during my presidency, and it has reached an all-time high. I believe I have fulfilled my promise to the faculty members as the president, that I would raise our university's *Hensachi*. Of course, I think that is pleasing for our university's people. However, I think it is high time that Japan refrains from ranking people and schools based on *Hensachi* at the bottom of my heart.



- Engineering
- Information and Computer Science
- Social Systems Science
- Creative Engineering
- Advanced Engineering

Figure 2