

## ***Tough Situation of Teachers for Informatics in Japanese Junior and Senior High Schools***

Yoshiaki Nakano, Kobe Municipal High School of Science and Technology, Japan  
Yasuichi Nakayama, University of Electro-Communications, Japan

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### **Abstract**

Japan played a major economic growth after the World War II, which could be realized with high industrial skill because of engineering education such as mechanical engineering and electrical engineering. However, in recent years, everyone agrees that the importance of information technology is rapidly increasing, while the industrial technology is also inevitable. Currently in Japan, IT education is responsible for the subject "Technology" in junior high schools and the subject "Informatics" in senior high schools. It is self-evident that excellent education relies heavily on excellent teachers. The recruitment of teachers in Japan is conducted for each prefectural board of education. The authors asked all the boards of education throughout the country to disclose information and investigated the present situation of hiring teachers. As a result, despite the fact that the number of faculty members in "Technology" in junior high schools and "Informatics" in senior high schools is much less than the required number, almost no faculty recruitment has been conducted, and as a result, It is clear that teachers of unrelated subjects doing classes or letting people without teacher's license temporarily take charge of classes. Because such an environment, class content is far from computer science in many cases, education is almost not done such as programming. Fulfilling the teacher recruitment and in-service teacher training and improving Japan's information technology capabilities, the authors are very worried about the future of Japan.

Keywords: Informatics, Recruitment of Teachers, Teachers' License

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## Educational System in Japan

Figure 1 shows the educational system of Japan. Elementary school (ES) and Junior High school (JHS) are mandatory. Most of the students of JHSs go to Senior High school (SHS). Then over half of the students of SHSs go to university or college.

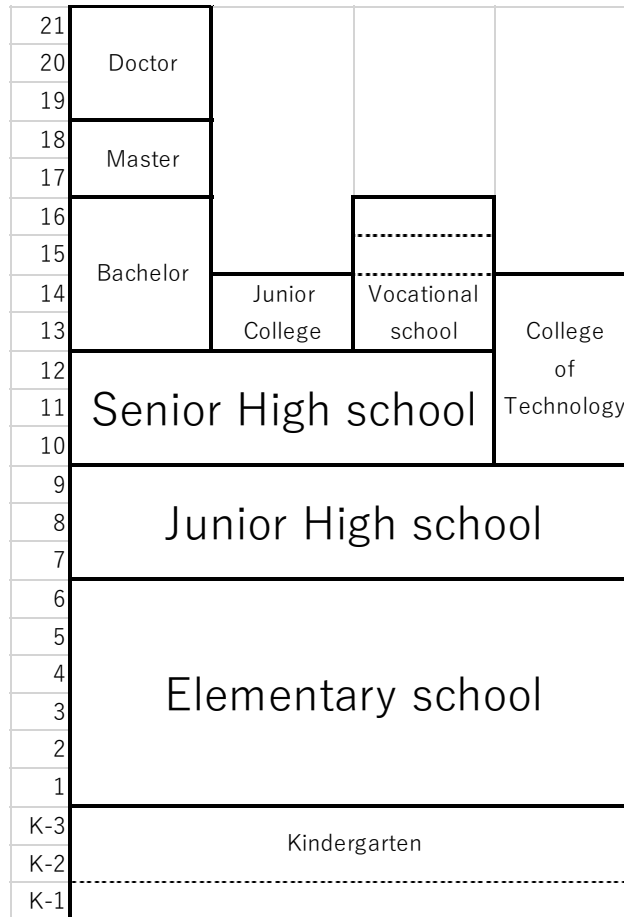


Figure 1: the educational system of Japan

Informatics education in Japan is played in a part of “Integrated Studies” at ES, a part of “Technology” at JHS and “Informatics” at SHS.

### in Elementary school

“Integrated Studies” is inter/multi-disciplinary subject and it is about 4.8% of all class hours in ES. (Figure 2)

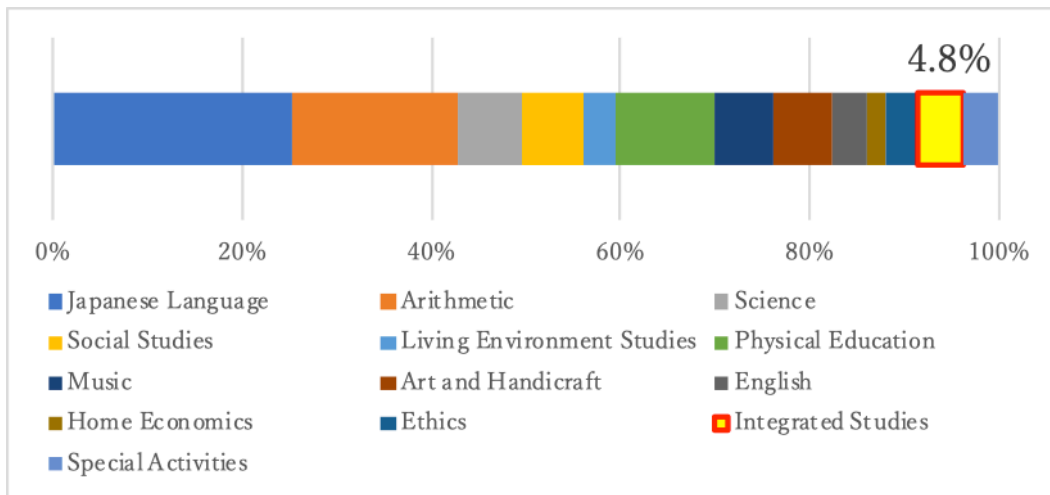


Figure 2: class hours in ES

It consists of various contents such as:

- International understanding
- Informatics
- Environment
- Welfare and Health
- etc.

In ES, the pupils can study for Informatics about at the most only 1% of total class hours. And the contents are follows:

- Basic operations of computer such as keyboard operation
- Logical thinking skills by experience using computer

### in Junior High school

In JHS, “Technology” covers Informatics education and it is about 2.9% of all class hours in JHS. (Figure 3)

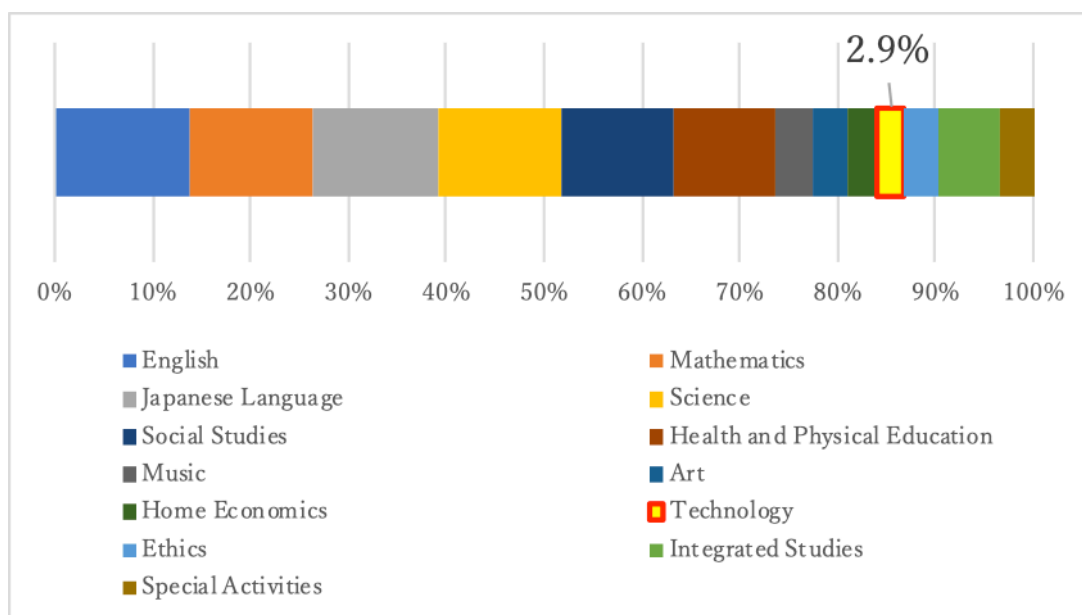


Figure 3: class hours in JHS

“Technology” consists of 4 major parts:

- Materials and their Processing
- Energy Conversion
- Biological Breeding
- Informatics

In JHS, the students can study for Informatics about at the most only 0.7% of total class hours (about 20 hours in 3 years).

The domain of Informatics treats follows:

- IT to support our life and society
- Interactive content by computer programs
- Measurement and control by computer programs
- Development of society with IT

The students of JHS have to study all these contents in just 20 hours.

### **in Senior High school**

The curricula are very different from each school, however there is up to 2% of total class hours in SHS for Informatics at every school.

Current subject “Informatics” is started from 2013. This subject handles the follows:

- Active use of information and its expression
- The Internet and communication
- Issues of today’s information-laden society and information ethics
- Construction of desirable information societies

There is no programming.

But, the next subject “Informatics” will be shifted to computer science from 2022.

- Problem solving for information society
- Communication and information design
- Computer and programming
- Utilization of information communication network and data

### **Teachers**

Teachers of ES are in charge of a classroom. This means that they have to teach all subjects. They are almost based on Liberal Arts never science or technology.

Teachers of JHS and SHS are specialty of their subject. But, many teachers in charge of “Technology” in JHS or “Informatics” in SHS are not specialized in Technology or Informatics. They are:

- in charge of OTHER subjects without license for “Informatics” (only have other subjects)
- Temporary licensees (no teachers license)
- Part-timers

Teachers for “Home Economics” and “Technology” in JHS are extremely many no licensees. (Figure 4)

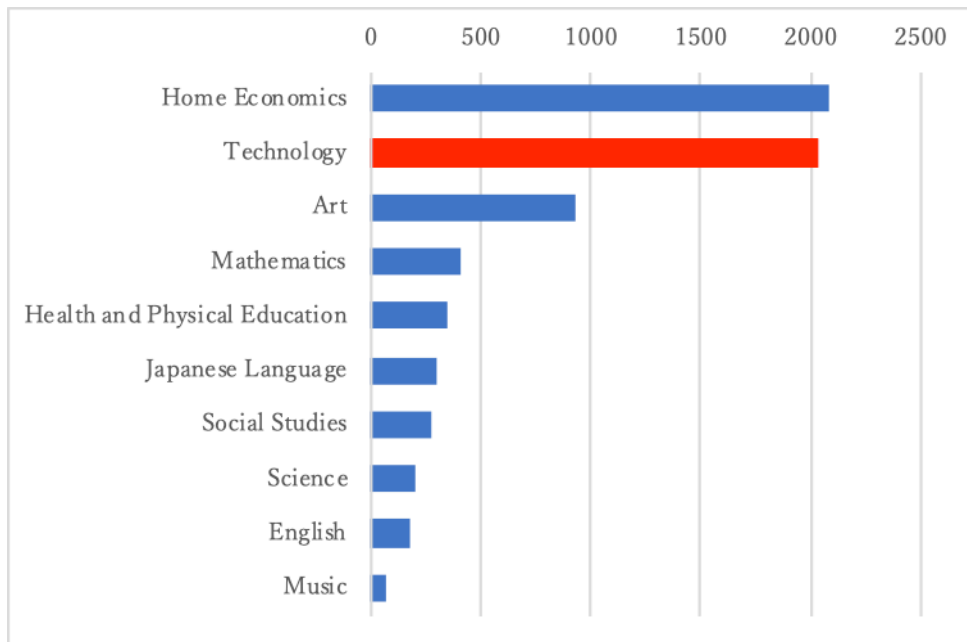


Figure 4: Teachers without license for the subject in JHS

The most teachers who teach “Technology” are for “Health and Physical Education”, which is far from Technology. Teachers for “Social Studies” are same. (Figure 5)

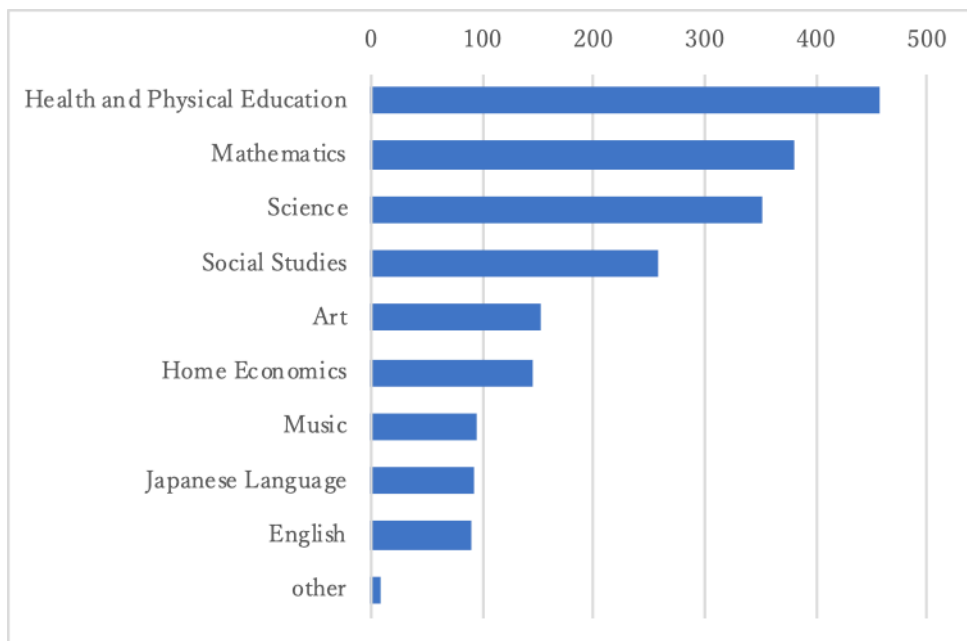


Figure 5: Teachers for “Technology” in JHS

Teacher employment for “Technology” is about 2.7% of total. (Figure 6)  
 This is similar to the rate of the class hours. This means that this tough situation cannot be changed and will be continued.

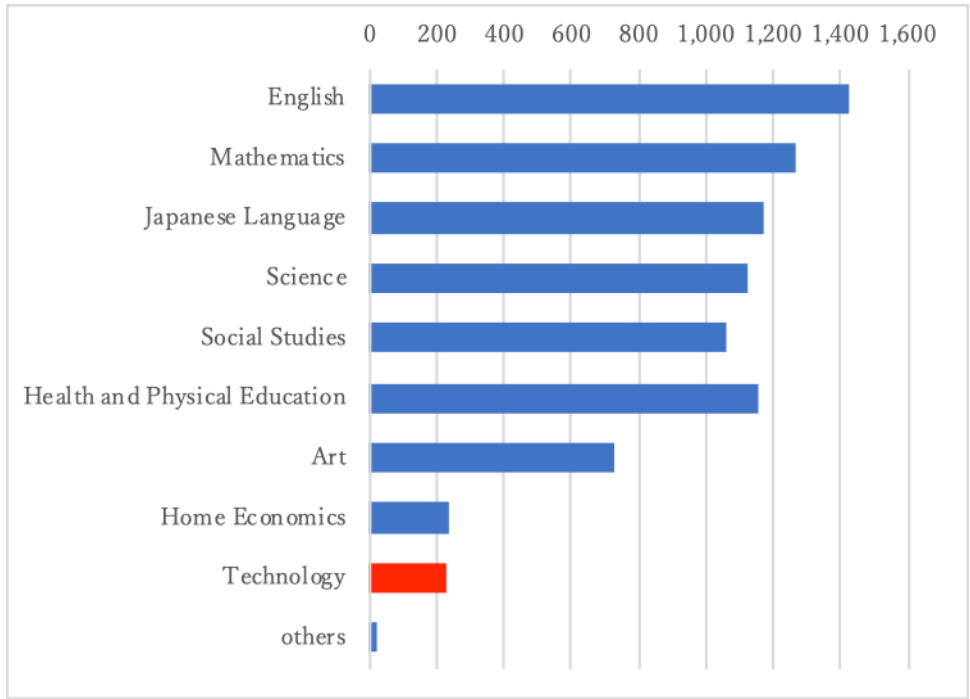


Figure 6: Teacher Employment for JHS

Teachers for ONLY “Informatics” in SHS are extremely many no licensees. (Figure 7)

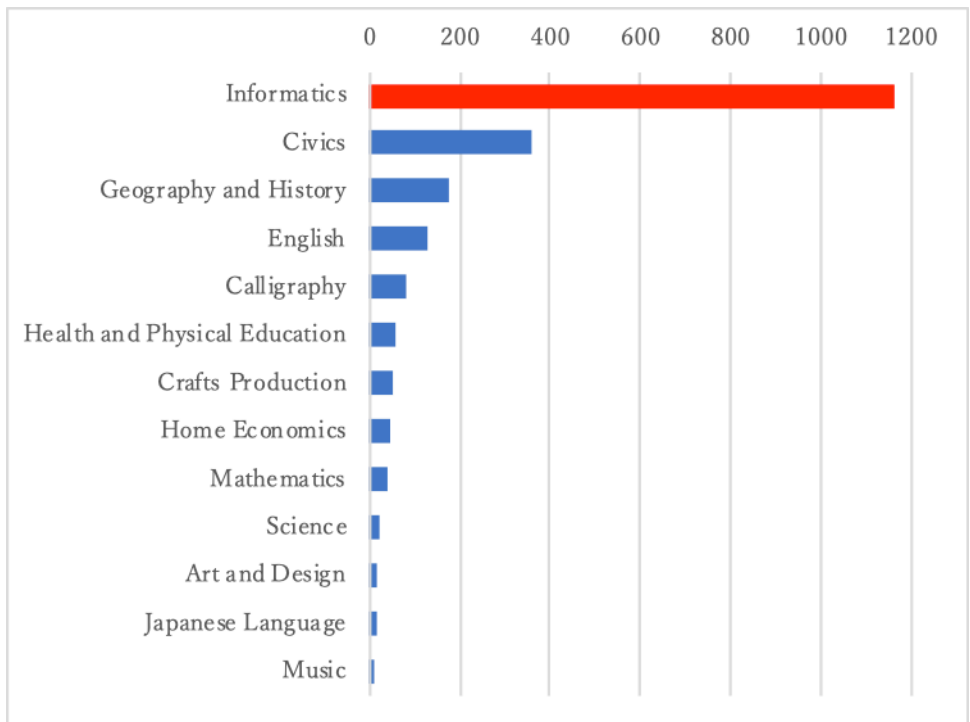


Figure 7: Teachers without license for the subject in SHS

The most teachers who teach “Informatics” are for “Commerce”. (Figure 8)

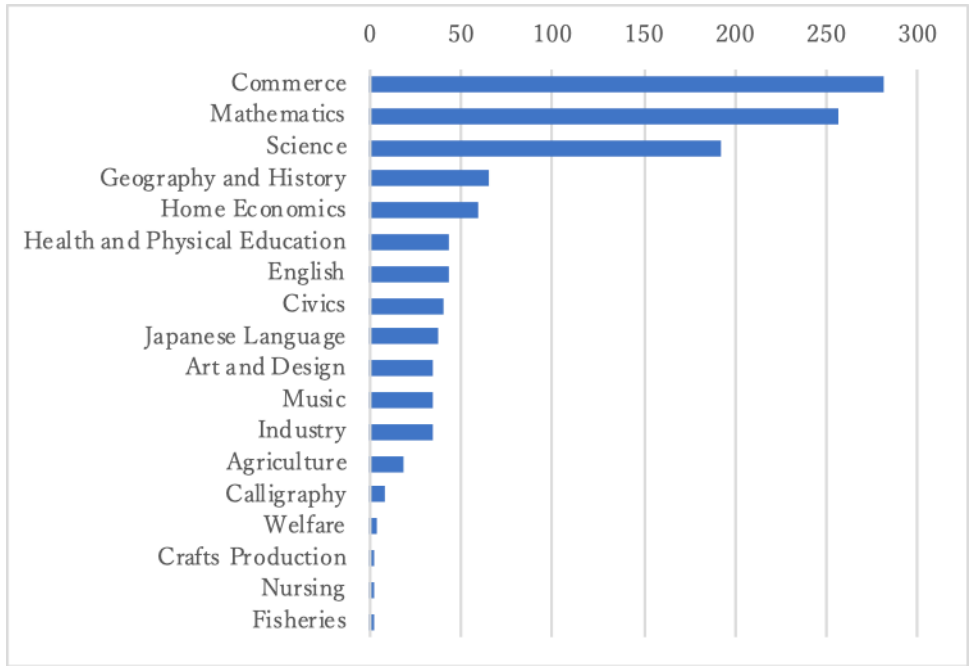


Figure 8: Teachers for “Informatics” in SHS

Teacher employment for “Informatics” is about 1.1% of total. (Figure 9)  
 This is very small rate rather than the class hours. “Art” and “Home economics” are almost same class hours in SHS to “Informatics”. However, the employment is about 4.2% and 3.3%. They are 4 or 3 times of “Informatics”. Only "Informatics" gets a raw deal.

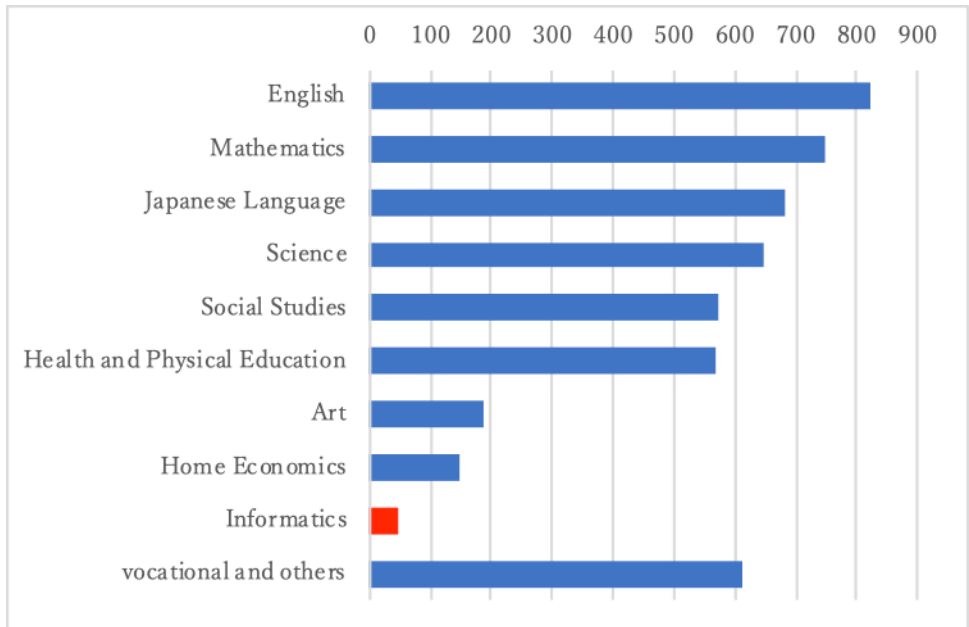


Figure 9: Teacher Employment for SHS

Only 20% is exclusive teaching Informatics, and 50% is teaching another subject concurrently. Remaining 30% is no license for “Informatics”. (Figure 10)

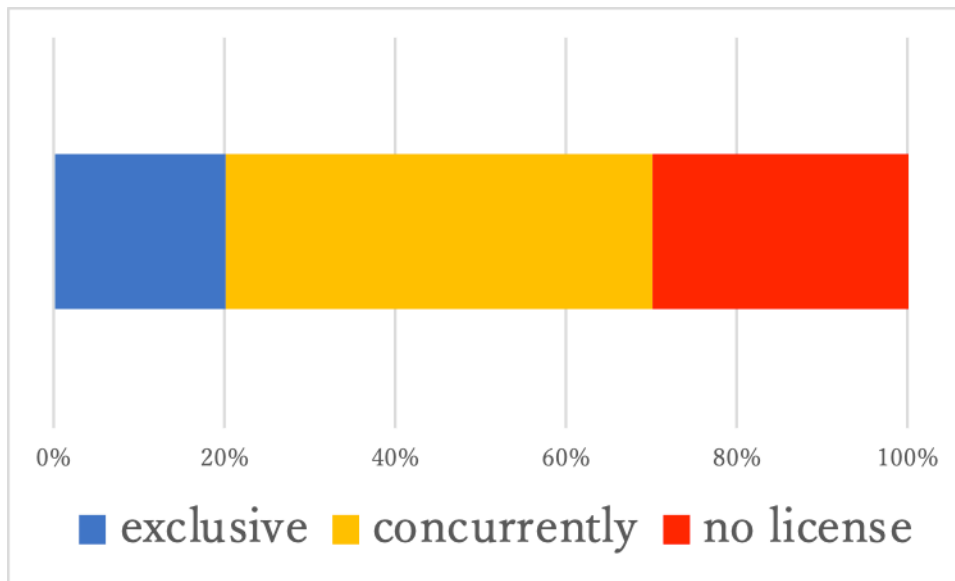


Figure 10: Teachers for "Informatics" breakdown by the license

Table 1 shows the usage of Social Networking Services compared with the students of SHS and the teachers for "Informatics". As for the messaging service of Japan, LINE is supported predominantly. I think Twitter is the media which is important of the immediate sending message. In Japan, many teachers are in their school from 7:00 a.m. to 10:00 p.m. And they are in charge of club activities on every weekend. They must not do personal communication during business hours. So, they cannot use such as Twitter. However, even the teachers for "Informatics" don't use these services, the authors think that this is an awkward position.

Table 1: the usage of Social Networking Services

	Students	Teachers
LINE	100%	90%
Facebook	5%	20%
Twitter	100%	5%
Instagram	100%	1%

(Only in my surrounding case)

Additionally, the most schools prohibit

- Students use their smartphone in their class
- Students (even teachers) bring their PC into their class

They can use only paper textbooks and notebooks.

The Japanese government is trying to promote informatics education by the policy "World's Most Advanced IT Nation Creating Manifesto" and "Future Investment Strategy". And at all schools, highly specialized teachers are required. However, the situation is in the opposite side.

## Conclusion

In Japan, Informatics education is responsible for the subject "Technology" in JHS and the subject "Informatics" in SHS. Teachers of unrelated subjects doing classes or letting people without teacher license temporarily take charge of classes. So, class content is far from computer science in many cases, there are no programming.



Fulfilling the teacher recruitment and in-service teachers training and improving information technology capabilities of Japan, the authors are very worried about the future of Japan.

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**Contact email:** [info@nakano.ac](mailto:info@nakano.ac)