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HANPUKU LEARNING: A NEW INFORMATION TECHNOLOGY EDUCATION METHOD BY INTRODUCING NATIONAL CERTIFICATE OF JAPAN INTO BANGLADESH

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Introducing National Certificate of Japan into Bangladesh**

Synopsis:

In this paper, we summarize the current status and issues of IT education in Bangladesh, and then describe the effects of introduction of Hanpuku Learning, a unique teaching method for ITEE. It also shows the excellence of young people in Bangladesh, which wants to become an IT nation, and proposes a possibility that is beneficial to both Japan and Bangladesh. The effect of the introducing ITEE is excellent, and it can be determined that the Japanese-style Hanpuku Learning adapted to Bangladesh.

Hanpuku Learning: A New Information Technology Education Method by Introducing National Certificate of Japan into Bangladesh

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Abstract

In this paper, we summarize the current status and issues of IT education in Bangladesh, and then describe the effects of introduction of Hanpuku Learning, a unique teaching method, for Information Technology Engineers Examination (ITEE), which is being executed as a national certificate originally from Japan. It also shows the excellence of young people in Bangladesh, which wants to become an IT nation, and proposes a possibility that is beneficial to both Japan and Bangladesh. The effect of the introducing ITEE is excellent, and it can be determined that the Japanese-style "Hanpuku (iterative) Learning" adapted to the temperament of Bangladeshi people and sustainable learning habits were established.

Keywords: Information Technology Education, Information Technology Engineers Examination (ITEE), Hanpuku Learning, Developing Country, Bangladesh

1. Introduction

In recent years, in Japan, a serious shortage of young workers has been shouted along with a declining birthrate and aging population. On the other hand, by promoting the working style reformation led by the government, the introduction of artificial intelligence (AI) or any other information technologies (IT) will improve the efficiency of operations, while the movement for optimizing work-life balance is rapidly increasing. As entire Japan enters the era of population decline, the number of companies that rely on skilled foreign workers as well as AI for the shortage of labor are increasing, while it is a high barrier for companies to properly identify the foreign countries that supply workers. This paper focuses on the People's Republic of Bangladesh (hereafter Bangladesh), which is remarkably developing in the Asian region, and describes the current status and issues of IT education in this country. In addition, by showing the

excellence of young people in Bangladesh, which is aiming to become an IT nation, we propose one possibility that is beneficial to both two countries; "lack of young workers due to declining birthrate and aging population (Japan)" and "lack of attractive jobs after graduation from higher education due to explosion of population (Bangladesh)".

2. Background and Issues of Bangladesh

Bangladesh is a relatively young nation, independent in 1971. It was regarded as one of the poorest countries in Asia before, but is now counted as one of the fastest growing countries in Asia. Since the country has population of 170 million people in about 40% of Japan's land area, it is the most densely populated country all over the world except for urban and island nations, in particular, the capital Dhaka is full of people. The population distribution has 65% of young people under the age of 25, and it is thought that the population bonus status will continue for a while.

Recently, the level of education is increasing even in Bangladesh. Currently, there are over 150 public and private universities, including the University of Dhaka, a public university established in 1921 during the British Indian Empire. More than half of them are private universities, but even North South University, the oldest private university, was established in 1992, and many of them have been established at remarkable speeds in the last 10 to 20 years. School facilities are mainly divided into two types: urban-type buildings and suburban-type large school area. In recent years, private universities with suburban campuses have been increasing rapidly, but due to chronic traffic congestion in the capital city of Dhaka, commuting time and means have become major issues. However, even if it is inconvenient to commute to school, and even if the tuition is relatively high at private universities, the number of households who want to attend higher education tends to increase, and this trend is expected to continue in the future.

In Bangladesh, the entrance and graduation timings of universities are not the same as in Japan, and private universities follow after mainly public university entrance examinations end. In addition, it is standard practice for students not to find a job while attending university, but to apply for a job after training such as internship after graduation. For this reason, job hunting activities tend to be prolonged because they apply for recruitment at any time in a year rather than collectively recruit new graduates as in Japan and get employment opportunities. As mentioned above, due to the growing young population and the immature industry in the country, it is said that it takes an average of three years to get a full-time job after graduating from university. Therefore, the number of young people who seek employment not only in Bangladesh inside but also in other

countries is increasing. Domestic recruitment demand is not keeping up with the increasing trend of higher education, therefore it makes difficult for young people who have graduated from universities to find attractive jobs.

Muslims make up about 90% of the population in Bangladesh. Although there were many Hindus in neighboring India and their occupations were limited by the status system, after that many young people entered the IT fields with hopes for an IT industry which was not described in traditional religious precepts. As a results, India has developed into a global IT powerhouse. Although the doctrine of Islam is equal in principle, there are some occupations that are practically limited by their background, therefore IT fields can be an opportunity for many young people to seize chances. In recent years, the Department of Computer Science and Technology (CSE) has newly been set up in many universities, but their curriculum and department management system have not been enough developed, therefore it is difficult to say that sufficient and appropriate educational opportunities have been provided. On the other hand, the government of Bangladesh is carrying out a national project called Digital Bangladesh, and aims to become an IT nation by 2021 with IT industry products as the main export items after the textile and agricultural and fishery industries. For this reason, much attention has been paid to IT engineers from the CSE department that support the IT industry.

From the above reason, it is imperative that the development of the IT industry that determines the fate of the country is urgent in Bangladesh. And it is also indispensable that IT education at universities, which are human resource development institutions, play a major role. To achieve this national project, it is necessary to introduce a well-considered IT education curriculum to universities in this country as soon as possible. In addition, if Bangladesh establishes a system that can sustainably develop and supply IT human resources all by themselves, it will be possible to overcome the so-called "developing countries".

3. ITEE Education Method Introducing Hanpuku Learning

One of the pillars of our project is promoting the spread of Information Technology Engineers Examination (ITEE). ITEE is an English-language edition of the Information Processing Engineers Examination conducted by Information-Technology Promotion Agency Japan (IPA) [1], an affiliated organization of Ministry of Economy, Trade and Industry of Japan (METI). Information Technology Professionals Examination Council (ITPEC) [2] controls this examination in the Asian region. Currently, the ITPEC member countries are the Philippines, Vietnam, Thailand, Malaysia (withdrawing in 2017),

Myanmar, Mongolia, and Bangladesh, and ITEE is held twice a year in spring and autumn. In this time, we focused on the Fundamental Information Technology Engineer Examination (FE exam), which is equivalent to the level 2 of ITEE and is an exam to certify the fundamental knowledge level for becoming IT engineers. In Bangladesh, it has been implemented since the fall exam in 2013, but it is the last in the member countries, and the results of passing FE exam was far behind other member countries at the start of our project (Table 1) [2] [3].

In order to break this situation, we considered introducing ITEE measures in Japan to Bangladesh. We investigated the curriculum for FE exam in Japan, and focused on adapting the method so that it would be easy to transplant to Bangladesh without losing the goodness of the method in Japan. One of the characteristics is the similarity of temperament between Japanese and Bangladeshi people. Japanese people have been good at repeating the same task since ancient times, and the iterative practice is also carried out on a daily basis even in educational settings. Bangladeshi people have similarly ability to iterative tasks, but on the other hand, there is a tendency to refuse to be logically unreasonable or sometimes to be seen the situations where things do not progress unless work instructions are given properly.

Therefore, in order to pass ITEE, it is important to summarize the Japanese-style iterative method and explain it to the local people in a coherent manner. We named this method Hanpuku Learning (iterative learning) that preserved the Japanese language feeling, and started compiling various learning materials to spread it locally as a unique method. Here, "hanpuku (iteration)" in hanpuku learning has multiple meanings, and a learning method was formulated from the following viewpoints in IT education.

- Iteration of dispersion:

Usually, lesson hours for each subject are generally once a week on the school timetable in higher education. If this opportunity is increased to multiple times by shortening the time per lesson, it is possible to touch the next learning opportunity without forgetting the contents of the previous study.

- Iteration of review:

The final lesson time of each day on the school timetable is set as the confirmation quiz time, and the content learned on the day is repeated and re-evaluated, thereby encouraging the memory of the learning content to be established.

- Iteration of viewpoint:

To deepen understanding of a specific topic from different viewpoints of multiple subjects. For example, if you want to learn the sorting algorithm, you can learn basic knowledge from IT fundamental subjects, learn the operation principle from algorithm subjects, and actually confirm the operation in programming subjects. As a result, you will be able to learn the relevance that can be organically constructed in the brain.

- Iteration of trend:

In ITEE, important questions of exams tend to be asked frequently over the past several years. By correctly answering these frequently asked questions, it is possible for examinees to steadily approach the passing criteria. If you practice to solve the past questions repeatedly, you will naturally be able to grasp the tendency of the questions you solved in the past. As a result, you will be able to learn the key points without spending time studying whole the range of exams comprehensively.

In addition, since ITEE is a Japanese-originated exam and there is a slight time lag before the equivalent exam written in English is established, there is a slight time gap of the trends in the local exams against the Japanese language edition. Here, we investigated the trends of questions between Japanese and English language edition. For example, Figure 1 shows the results of a survey of the English edition of the FE morning exam for 2016 fall (50 questions in the technology field) in which of the past questions in Japan were asked.

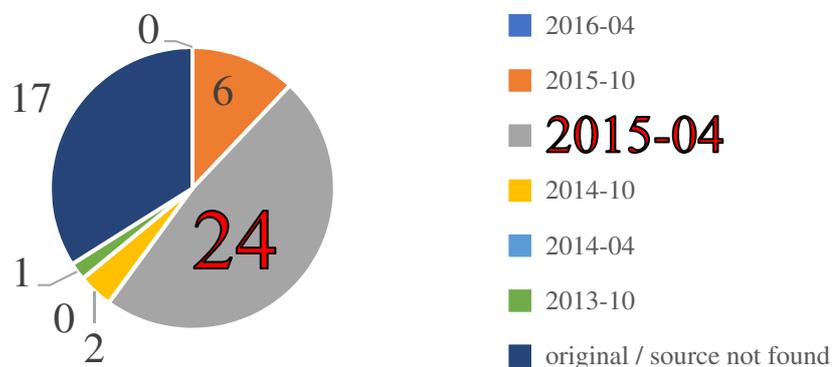


Fig. 1 An example of the question trends from past exam questions (ITPEC 2016 Fall FE Exam Technology Field)

From Figure 1, it can be seen that about 70% of the whole questions were asked from the past six exams (three years) in Japan. It should be noted that about half of the questions were asked from three times (one and a half years) before. Similar trends were observed in exams at other times, indicating that about 50% to 80% of the questions were the same or very similar to past questions in Japan. Based on these trends, we thought that it would be effective to translate the latest three untested exams into English and distribute them as a past exam collection book as one of the FE exam preparation materials in Bangladesh. In other words, there is a great possibility that "past exams" in Japan will become "future exams" in Bangladesh. By this method, it became possible to learn in a most efficient way for unknown questions to Bangladeshi people.

Based on our survey results, three types of learning materials [4][5][6][7][8] were edited and distributed locally. Specifically, it is as follows.

- FE morning examination past questions in Japan collection book English translation version (December 2017 first edition, September 2019 second edition)
- Selected FE afternoon examinations (July 2018 1st edition)
- ITEE teaching method training manual for trainers (February 2018 1st edition, July 2019 2nd edition)

In addition, several learning opportunities and events including the above learning or teaching materials were planned, and a studying roadmap was drawn up to the day of the examination. Figure 2 shows an example of learning materials and events.

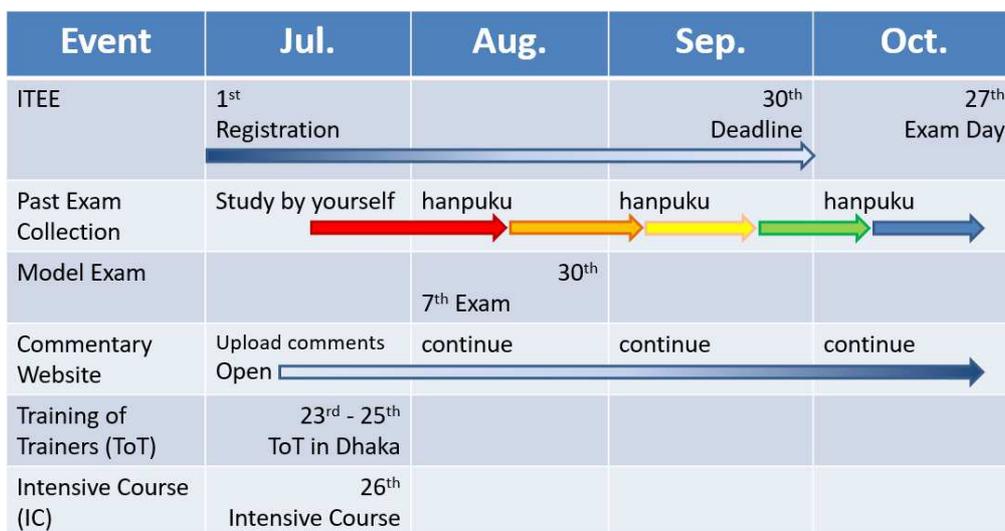


Fig. 2 Provided ITEE learning materials and events
(Example of the preparation for 2019 Fall FE Exam)

In Figure 2, the top row shows the scheduled period (in this case, July to October 2019). The second row of ITEE shows the official exam schedule, indicating the exam application period (three months from the month before the exam date) and the exam date. The third row of the Past Exam Collection recommends that the past exam questions be repeated five times in three months. The fourth row Model Exam is a so-called mock test, in which the same system as official exam is used for checking their skills by solving selected past questions or the latest questions in Japan that were not tested yet. The fifth row, Commentary Website, provides a system that allows students, passers, and trainers to freely ask and answer questions over Social Networking Service (SNS). The sixth row, Training of Trainers (ToT), is a so-called instructor training [9], and was invited twice in local and once in Japan to teach each university or company's trainers based on the above-mentioned ITEE teaching method training manual. The trainers who completed these ToT were certified as ITEE trainers, and encouraged to respond positively when examinees asked questions in their own affiliation or over SNS. In the last, the 7th row, Intensive Course (IC) is a special intensive course held in the large venue just before the mock test or the official exam taught by the author or ITEE certified trainers. The above-mentioned learning materials and environment were prepared and implemented mainly in the capital city of Dhaka during the two-year period from July 2017 to September 2019 (totally equivalent to four exam terms).

4. Results and Effects

In this chapter, we show the results of the ITEE measures taken by the hanpuku learning method described in chapter 3. Figure 3 shows the change in the number of FE full passers (who passed both the morning and afternoon exams), AM half passers (who passed only the morning exam) and PM half passers (who passed only the afternoon exam) during the period from 2013 fall when ITEE was introduced in Bangladesh to the 2019 fall at the end of our project [2].

According to Figure 3, in 2017 spring exam, just before the start of the project, only two people passed the FE exam in entire Bangladesh. However, in 2018 spring exam, when the project began to show substantial effects after the start of the project, it was able to produce 22 passers, the second-largest number at the time in history. Since then, the number of FE passers in Bangladesh, 34, 45, and 54, has been continuously increasing every time. Also noteworthy is the remarkable increase in the number of examinees who passed half of the exams, especially the remarkable increase in the number of AM half passers. It is thought that our hanpuku learning was effective in dealing with the

memorization exam questions in which the standard but important questions appear frequently. After that, the following examinations will maintain the potential existence of those half passers, and contribute to the increase in the number of full passers by concentrating on only the rest half exam, that is, not-passed AM or PM exam.

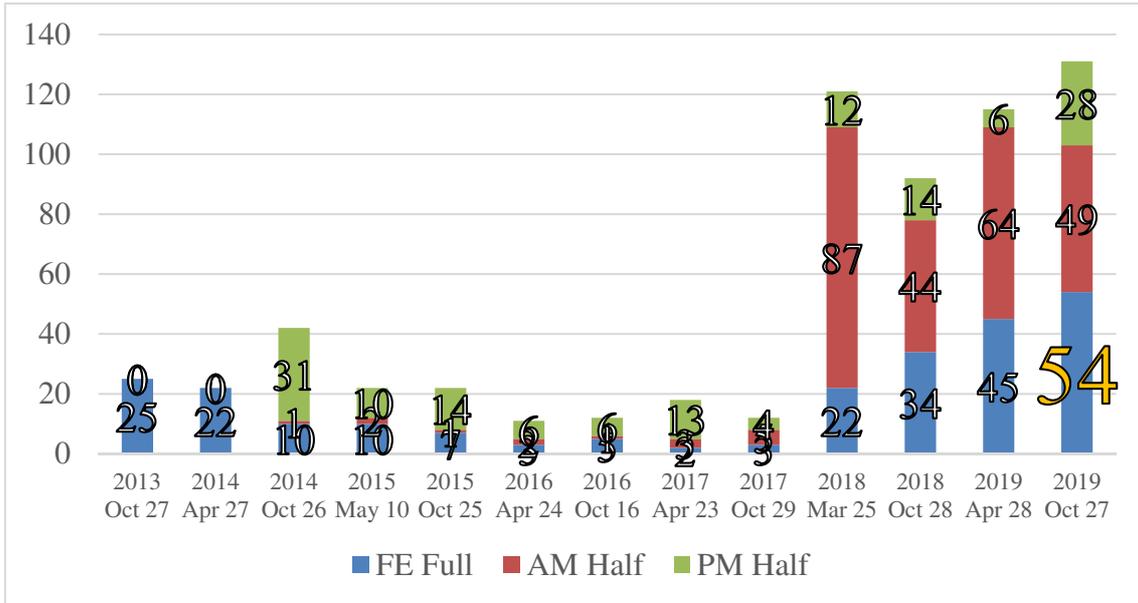


Fig. 3 Changes of the numbers of FE passers in Bangladesh

In addition, we achieved the excellent results in the ITPEC member countries [11] [12]. Figure 4 shows the top three member countries among all the examinees in the 2018 spring exam and the 2018 fall exam [2].

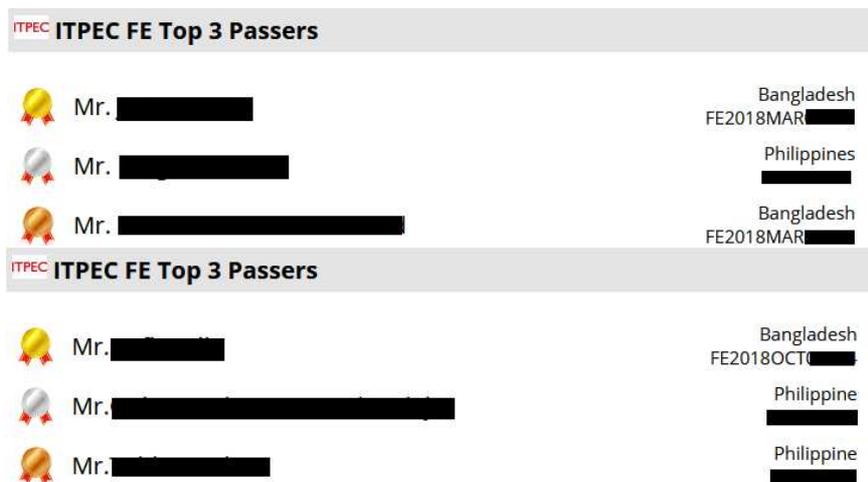


Fig. 4 List of top scorers in all the ITPEC member countries (Upper: 2018 spring exam, Lower: 2018 fall exam)

Figure 4 shows that Bangladesh obtained the first and third places in 2018 spring exam and the first place in 2018 fall exam. This indicates that the examinees did not only learn in pursuit of passing efficiency, but also learned the essence of the study fields through hanpuku learning. Another noteworthy achievement was that they got Asian champions not only once but twice continuously. From the above results, it is considered that the proposed method has been proved to be effective in Bangladesh.

5. Conclusions

In this paper, we described the current state of IT education in Bangladesh and new educational methods based on national certification exam in Japan. The effect of the introducing of our method is quite excellent, and it can be judged that Japanese-style "hanpuku learning" has adapted to the temperament of Bangladeshi people and sustainable learning habits have been established.

One of the future work is to improve the exam attendance rate. ITEE is held on a Sunday in principle, but Sunday is a weekday for Muslim nations, and it is not usually permitted to be absent from their work or school for taking this exam. In light of this problem, ITPEC has decided on a trial basis to hold the 2020 spring exam on Saturday. Bangladesh has the highest proportion of Muslims among the ITPEC member countries, therefore the results of 2020 spring exam may be a major factor in determining the future exam schedule. In addition, the timing of the Ramadan (fasting) month changes every year depending on the calendar, therefore it is possible that the exam date may be included during fasting term. In general, it is said that all work efficiency decreases during the fasting month, so it is concerned with the effect on exam results. In order for ITEE to spread widely in Asia, the key factor is not only in terms of education, but also how to treat such cultures or religions.

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