

# Establishing a Remote Education System on Hematological Morphology between Japan and Cambodia

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## 【Background】

To provide higher-quality education on hematological morphology to medical technologists, individual training is required. However, due to the large number of trainees in school, it is difficult to allocate an appropriate number of trainers. It is especially difficult to find well-trained personnel in developing countries. This pilot study evaluates hematological morphology education by use of an e-learning system conducted by Japanese trainers with Cambodian students via the internet.

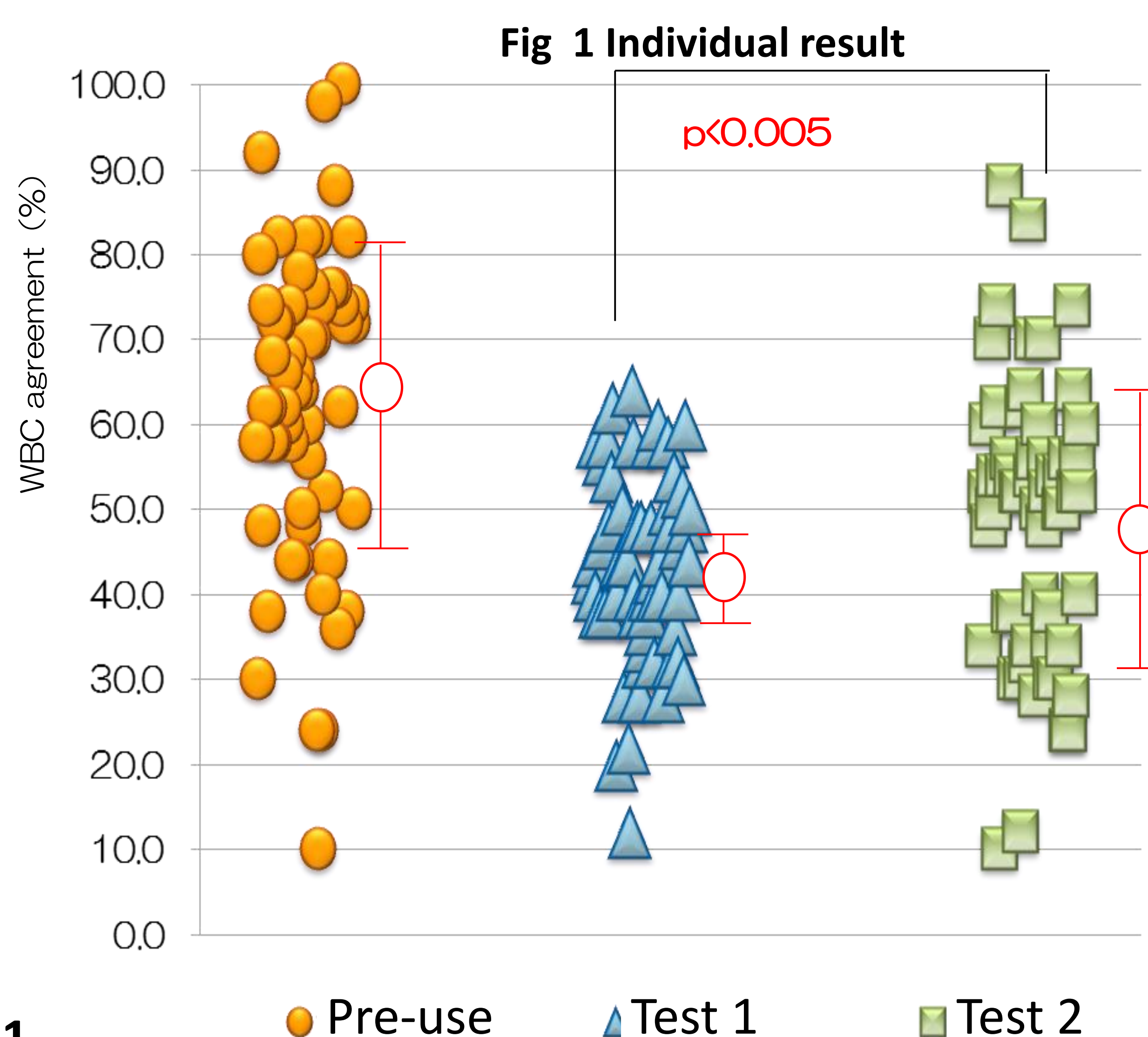
## 【Conclusion】

Students communicated with Japanese experts and were motivated to study WBC differentiation. This study demonstrates that an e-learning system could be useful in practicums.

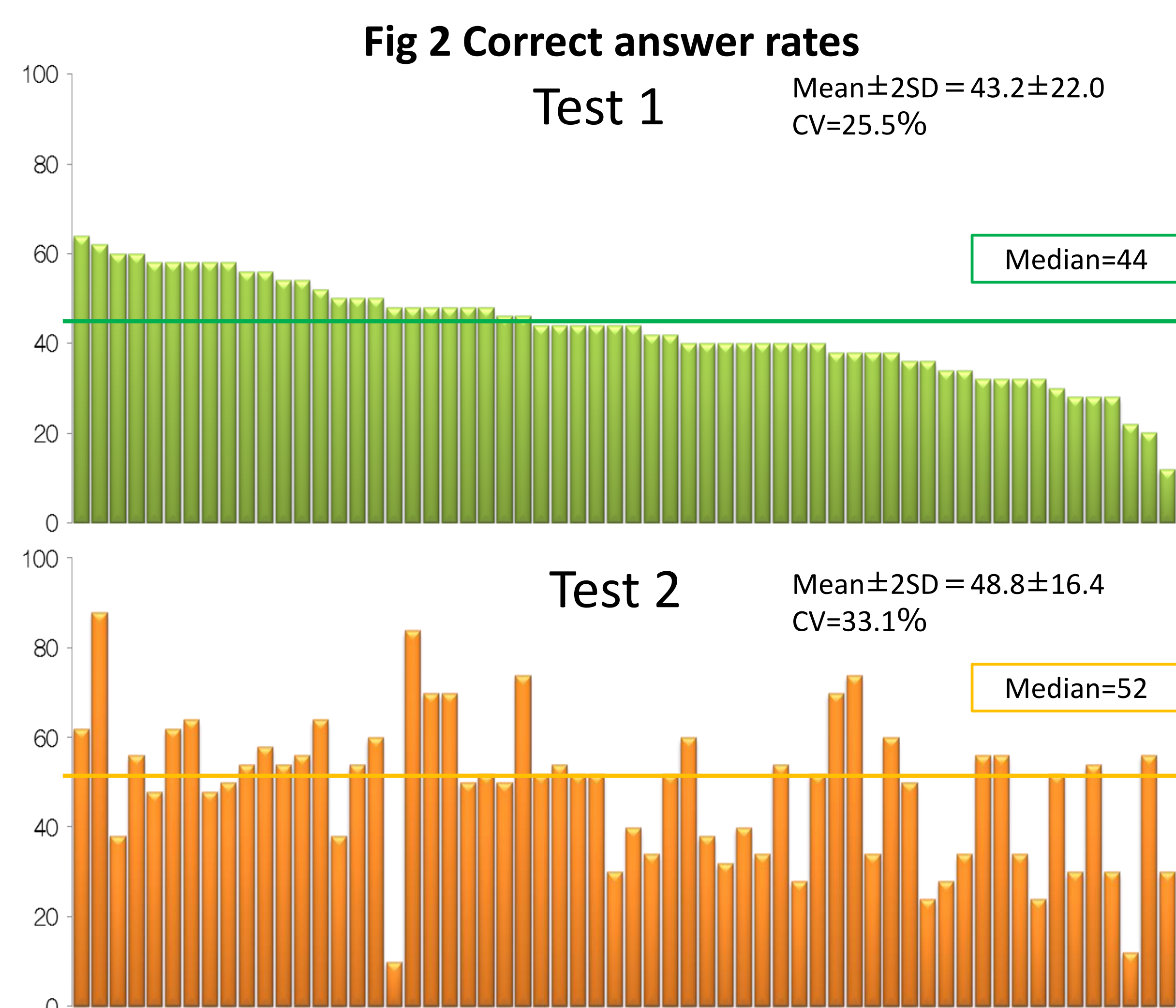
## 【Results】

Table 1 Result of tests	Pre-use	Test 1	Test 2
Student's number	60	61	63
Average	62.5	43.2	48.8
SD	18.5	11.1	16.4
CV(%)	29.6	25.7	33.6
Lowest score	10	12	10
Highest score	100	64	88

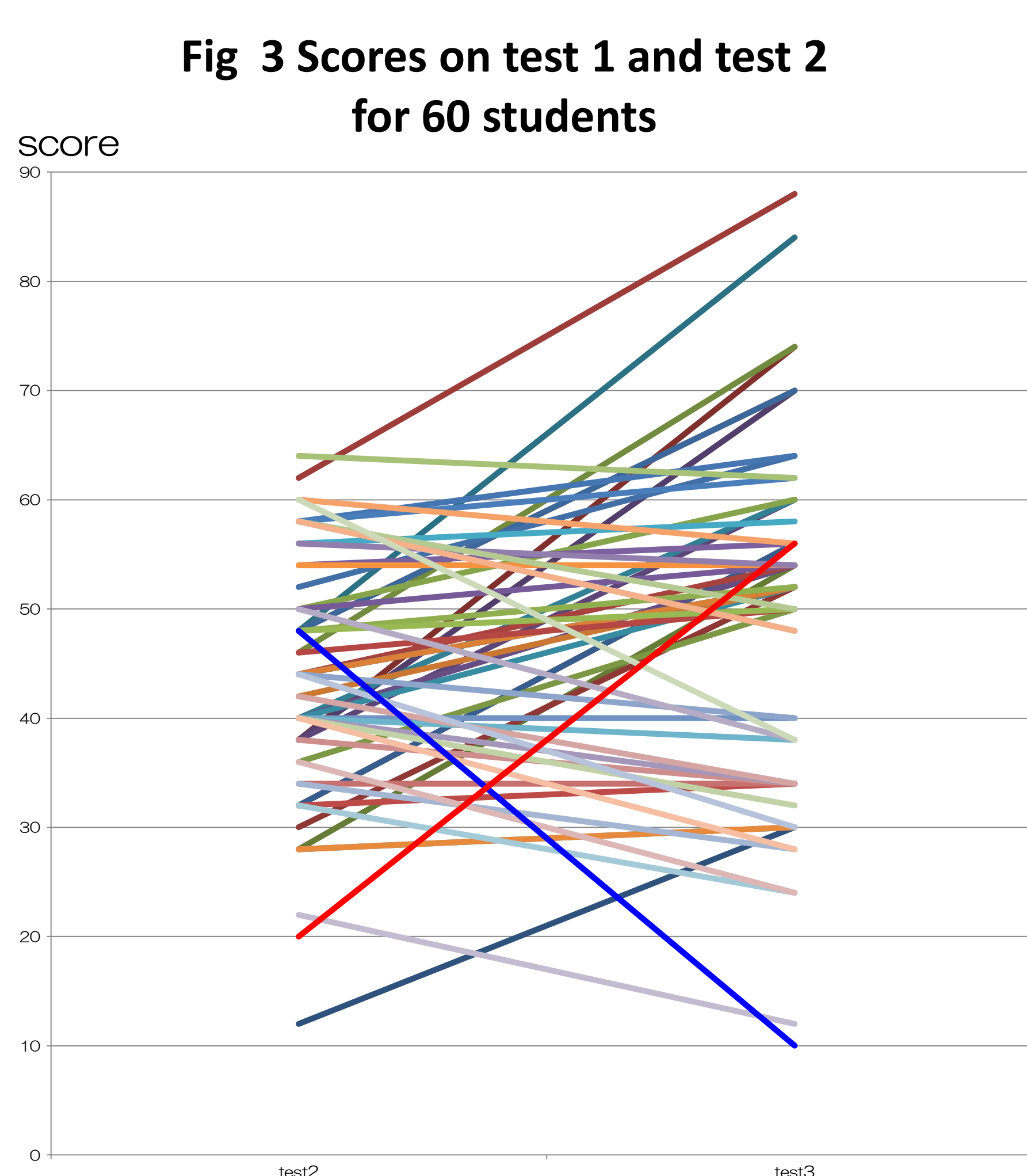
**Table 1**  
The numbers of students who have taken two tests were 61 and 63, respectively. The statistical analysis were done on 57 students who have taken all three tests. The average correct answer score was higher for the second test(48.8%) than the first test (43.2%). The lowest and highest scores, respectively, were 12 and 64 for Test 1 and 10 and 88 for Test 2.



**Fig 1**  
In this graph, individual points indicate the score rate of WBC agreement of each students with examiner. Statistical analysis were done between the test 1 and 2. P-values indicates significant differences. Red circles indicate the mean values in each tests and red lines indicates their standard divisions, respectively. Test2 were significantly more successful than test 1



**Fig 2**  
This graphs show the comparison of the correct answer rates of 60 students who have taken both test 1 and 2. The vertical axis shows the score of each student. The individual bars in two shows the scores on each student. Horizontal lines indicate the median score in each test. On test 1, average score is 43.2 and median is 44, and test 2, average is 48.8 and median is 52. On test 2, CV was higher than that on test 1, and the median was higher than the average. There is a big difference between the scores on students who did hard for self-learning and the other who did not do so much.



**Fig 3,4**  
Changes in individual student's score between test 1 and 2 are indicated in Fig3. Improvement rate on score of each student are indicated in Fig4. Green bar shows the ratio of how much the score was increased or was decreased in test 2, when the score of test 1 is set as 100%. The students who have most improved score achieved 180% improvement. The minimum improvement rate is around minus 80. 22 out of 60 students have the good improvement rate of 20% or more, and 9 students have the lower rate of 20% or more. 36 students out of 60 improved their scores.



Correct answer : Myelocyte

Lymphocyte	17
<b>Myelocyte</b>	<b>14</b>
Promyelocyte	6
Monocyte	5
Large Granular Lymphocyte	4
Prolymphocyte	3
Metamyelocyte	2



**Fig 5**  
We could use this material to know how did participants make misunderstand of cell. In this question, 17 of the 61 students answered lymphocytes.

## 【Method】

Sixty-eight 3rd-year university students who had finished both lectures and practicums in hematology volunteered to participate in this study during April 2017. Students were told that there was no disadvantage if they did not attend or chose to discontinue the program. First, students learned how to use the e-learning system WEB-PRO (CellaVision, Lund, Sweden) from Cambodian trainers who had been trained by Japanese experts (Pre-use). One week later, Japanese experts requested that students open the 1st white blood cells (WBC) in peripheral blood test sent via e-mail. Other one week after, the 2<sup>nd</sup> test was provided.

The authors have no conflicts of interest directly relevant to the content of this presentation.