Physics Learning with Personalized System of Instruction (PSI) in Heat and Gases law

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Abstract. *To improve the learning process and the consolidation of learning, paying attention to individual differences among learners is required. Personalized System of Instruction (PSI) is an educational method that clearly takes individual differences into account for learners. In this research, physics learning by PSI in Heat and Gases Law is compared to learning by traditional method in this topic. The lesson plan based on the PSI for the topic of heat and gases law in secondary school textbook has been designed and two groups of high school students in Sari (a city in Iran) were randomly selected . One of the groups was taught by Personalized System of Instruction (PSI) and the other group by traditional methods. This study is a semi-experimental research and the results show personalized system of instruction (PSI) is much better than traditional method.*

Keywords. Personalized System of Instruction (PSI), The traditional method, Learning, Heat and Gases Law.

1. Introduction

In our classrooms, some students learn fast and some students learn slowly. When methods of teaching are not suitable to teach all of the students, a group may be learning but certainly the other group may not. According to researches, most schools in different countries, have the old educational system in which the teacher teaches and students just listen [18]. While in accord with the psychological research on learning, students should not be only listeners, but also should participate in other activities such as problem solving, discussion and analysis, and evaluation levels [2]. If teachers consider their students' individual differences in their educational methods, each student enjoy the educational conditions coordinated with the conditions that he is learning. Therefore, the amount of learning to all students peaks [3]. Fred Keller in 1960 established a method of teaching that today is named the Keller Plan or Personalized System of Instruction (PSI) He expressed this plan in the famous article "Goodbye Teacher". Very extensive researches have been done to evaluate the performance of PSI and most of them have been successful [4]. Slavin reviewed these studies to examine the success of this project and found positive results [5]. Teaching method that has been examined in this study is Personalized System of Instruction (PSI).

2. Methods

The study of two independent variables (two teaching methods) and dependent variable (Learning Physics) has been reviewed. Two groups of students were selected. Students of this study were high school students. They were chosen from two available classes, fully randomized and also simple sampling was selected. Transference class was completely random. Tools for gathering data were standardized tests HTCE and valid tests and the tests which have been made by the teacher. The topic of Heat and Gases Law from the secondary high school textbook was divided into six parts. For every part the lesson plan was prepared based on the PSI. This course was taught in eight sessions, each 1.5 hours (four weeks of training). One of the groups was taught by PSI and the other group was taught by traditional method. In the first session of both classes Pre-test and in the final session Post-test were given. Pre-test and Post-test were consisted of 20 multiple choice questions (four choices for each question were available). The number of students in both classes was 22.

3. Analysis of the data

To analyze the data and compare mean marks, T-test study improvement was used.
When students' learning was compared, we realized that students taught by PSI had succeeded better than the students taught by

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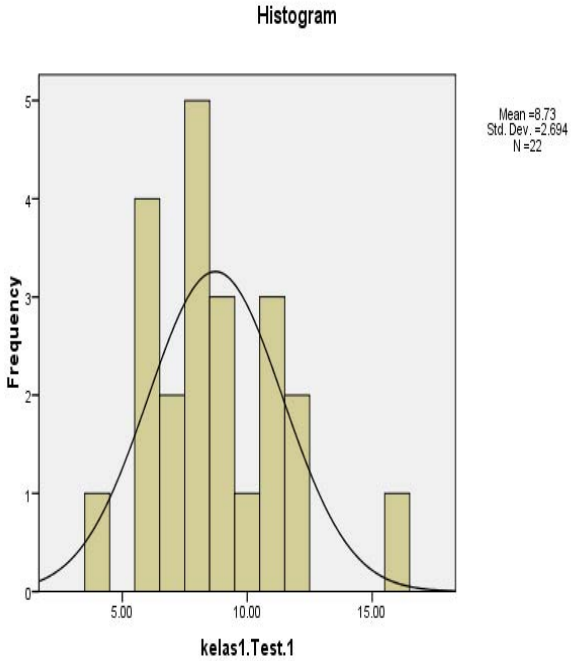
traditional method. The charts, in the next page, show this difference.

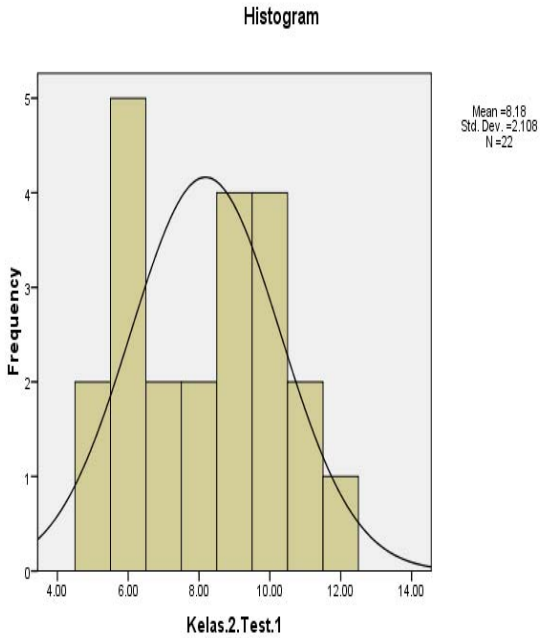
4. Conclusion

The results of this research show that students, taught by PSI method, learn more effectively. In other words, if we consider our students' individual differences in our educational methods, each student enjoy educational conditions and he/she learns better than before.



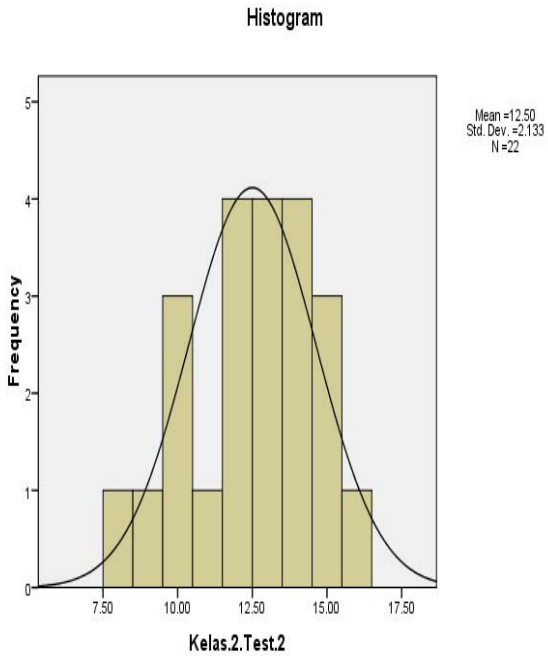
Pre-test. Group1 (traditional method)

1.

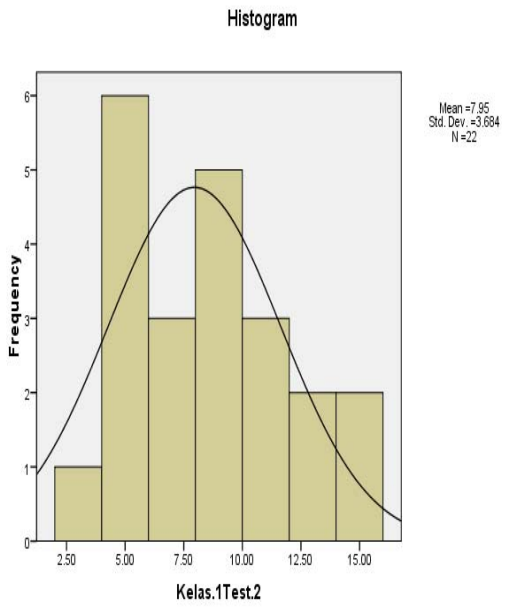


Pre-test.Group2 (PSI)

2.



Post-test. Group2 (PSI)



Post-test. Group 1 (traditional method)

References

[1] McDermott L.C," The physics education group at the University of Washington physics by inquiry" vols 1&2, john wiley &sons, New York, 1996 .

[2] Redish, E. F, "Teaching physics with physics "Suite University of Maryland, john wiley &sons, 2003.

[3] Slavin, R.E "When does cooperative learning increase student achievement?" Psychological Bulletin, 1984.

[4] Keller, F.S." Goodbye, teacher" Journal of Applied Behavior Analysis, 1968.

[5] Bloom Benjamin S. "The 2 Sigma Problem: The Search for Methods of Group Instruction as Effective as One- to- One Tutoring". Educational Researcher, Vol .13.