

# Mapping of Mathematics Learning Outcomes using Self-Regulated Learning Methods with Chrono Type Conformity and Study Time and Gender Influence Review for Junior High School Students

Nani Ratnaningsih, R. Reza El Akbar \* and Edi Hidayat

\*Corresponding author email id: reza@unsil.ac.id

Date of publication (dd/mm/yyyy): 08/03/2018

**Abstract** – The applicability of the method SRL has been applied to two secondary schools a place of research. This study focuses on mapping student - learning outcomes using the SRL method in the learning process, then map to the appropriate Chrono type and study time by taking into account the gender effects on the mapping. The mapping is useful to see the relationship pattern between learning result variable (student performance), Chrono type, study time and gender influence on the mapping. The purpose of this study is to explain the effect of learning outcomes in students who have different Chrono type and learning habits. The second describes how the relationship pattern between variables for further study. Third, to know the effect of gender on existing variables. The stages performed in this study consist of four stages. The first stage of preparing the condition of treatment in schools that became the case study for conditioned the method of SRL in learning mathematics. The second stage is preparation of all research components such as questionnaires, secondary data such as mathematical values and other components related to research. Third stage is mapping between research variables and the last stage of the fourth is analysis of mapping results. The result of the research has formed a pattern of relationship between values with Chrono type, which corresponds to study time. In addition, the influence of gender on SCL value for the learning time in accordance with Chrono type.

**Keywords** – Results of Mathematical Learning, Self-Regulated Learning, Chrono Type, Gender Effect.

## I. INTRODUCTION

Mathematics liked in some schools that have high student capacity. In contrast, in some schools that have an average ability capacity have a wide range of mathematical scores. Various ways taken by teachers to improve students' learning ability. One of them by conducting relevant research, with the aim of acquiring methods to improve students' learning ability. In this study will be studied mapping between student learning outcomes with other research variables such as the suitability between study time, Chrono type and in this study also discussed how the gender impact on the mapping will be made, so as to obtain the pattern of relationships that can be done and taken conclusions.

The method of SRL is a method taken in the process of learning mathematics. The result of this process measured as the final value or value of student learning outcomes. Self-regulated learning as described by Schunk, D.H. & Zimmerman, B.J. (2003) is the process of how a learner regulates his own learning by activating cognitive, affective and behavioral to achieve learning objectives. The use of instructional media on the self-regulated learning approach

as described by Ratnaningsih, Nani, Hidayat, Edi. & Akbar, R. Reza El. (2016) used to simplify and assist the learning process. The focus of the study of science is to learn mathematics based on self-regulated learning specific to junior high school students.

Some cases in research related to Chrono type usually discusses the relationship between Chrono type and employee performance in companies that implement shift work system. In several research chorotype closely associated with shift work. Another research is a reflection of human, whether prefers to indulge and prefer to be active. As previously investigated, Chrono types, studied in shift workers associated with workload and performance has presented by Widyanti, A., Soenaryo, I., & Akbar, R. Reza El. (2010). Chrono type and this argument from Lehnkering, H. and Siegmund, R., (2007) has shown to affect many aspects of life and other habits. Kuhnle, T.K (2006) suggests in his dissertation that a person's Chrono type can be performed and analyzed quantitatively. Other research on Chrono type studied presented by Widyanti, A. Mahachandra, M. dan Satalaksana, I.Z. (2010) to see and compare the Chrono type of shift workers and students in Indonesia.

In this research focus, Chrono type study paired with the suitability of study time. Chrono type in this research is into three types, namely day type, normal type and night type. In this research, only two types of Chrono type examined the type of day and night. If the students' learning habits at night, then the student has a night Chrono type then it can be define that the student is define to have a match between the Chrono type with the learning time. Influence of gender in each condition will be examined in this research to know whether there is gender effect on result of student's learning. This value in two conditions that Chrono type appropriate with learning time and that is not appropriate.

The Chrono type measurements in this study used the Munich Chrono type Questionnaire (MTCQ) in Indonesia, a questionnaire obtained from several research journals such as journal from Roenneberg, T., Wirz-Justice, A. and Mellow, M., (2003). All journal in the stage of literature review adapted to the study conditions. Other reverence Christoph Randler, Michael Schredl, and Anja S. Göritz (2017), Jose Reinaldo Maximo Gomes et al., (2017), use in this research to complete the questioner and add information of the research.

This research is a follow-up study that previously been studied with several different results and has been published in several journals, while this study has the purpose of exposing the effect of learning outcomes on students who

have different Chrono type and learning habits. The second describes how the relationship pattern between variables for further study. Third, to know the effect of gender on existing variables. Based on the previous description, this research entitled is "Mapping of Mathematics Learning Outcomes using Self-Regulated Learning Methods with Chrono type Conformity and Study Time and Gender Influence Review for Junior High School Students".

## II. EXPERIMENTAL DETAILS

- A. The first stage of preparing the condition of treatment in schools that became the case study for conditioned the method of SRL in learning mathematics. Coordinate with junior high school especially with mathematics teacher. The method used in learning is self-regulated learning. At this, stage the determination of students who be selected as research respondents.
- B. The second stage is preparation of all research components such as questionnaires, secondary data such as mathematical values and other components related to research. As well collect research data covering the average value of student progress reports for mathematics subjects, as well as brief interviews briefly explore patterns, learning time habits, student interest in subjects and other information.
- C. Third phase is mapping between research variables. Perform data analysis previously done first by conducting a series of data codification of research results.
- D. The fourth stage is to analyze the mapping result, to see the relationship pattern and to observe the gender effect in this research.

## III. RESPONDENT OF RESEARCH

The recipient of this research is a junior high school student in one of the junior high schools in Tasikmalaya city. The number of respondents studied in this study amounted to 87 respondents, of the total respondents who planned as many as 120 people. Prior to the research, initial coordination since the end of 2016 to condition the students using self-regulated learning approach used in mathematics learning. Respondents of this study are similar to previous researches that have been studied by a team of researchers from the University of Siliwangi, but different in terms of focus of research studies.

## IV. RESULTS AND DISCUSSIONS

1. At this, stage the process of preparing the condition of students who will used as research respondents. At this stage, each student performed the same treatment as materials. Methods and at the end of this treatment is done measuring the value of student learning outcomes. The results of demographic data can have presented in table 1 below.

Table 1 Demographic characteristics and conditions of study population

Variable	Men (n=42)			Women (n=45)		
	Mean	SD	Range	Mean	SD	Range
Age (year)	13.71	0.71	12.5-15.0	13.56	0.49	13.0-14.5
Value Lesson	82.14	7.25	70.0-95.0	80.56	7.01	70.0-95.0
Duration of Learning	85.71	25.08	45-120	79.33	21.36	60-120

2. Questionnaires that have been designed and available based on the literature search results; this step is to make a student Chrono type measurement questionnaire. The questionnaire modified to make it easier for parents to fill their children's habits in daily activities such as bedtime, waking, sleepiness and other questions. A series with this stage collect research data covering the average value of student progress reports for mathematics subjects, as well as brief interviews briefly explore patterns, learning time habits, student interest in subjects and other information,
3. At the mapping stage, if the Chrono type with the corresponding learning time is define to be corresponding otherwise incompatible. Mathematical values can be group into high and medium. The mapping results can have presented in the following figures. Figures 1 Mapping learning results with Chrono type. Shows that the tendency of people who have a corresponding learning time with Chrono types have a value above average, while for students who do not correspond between the time learning with Chrono type will have a tendency to have a small value.

Fig. 1. Mapping learning results with Chrono type

Conformity Chrono type with learning time			The value of student learning by gender		
Chrono type	Learning Time	Justification	Men	Women	Average
Early Type	Afternoon	Corresponding	High	High	High
Early Type	Night	Not appropriate	Average	Average	Average
Late Type	Afternoon	Corresponding	High	High	High
Late Type	Night	Not appropriate	Average	High	Average

4. The result of data analysis is that there is a very significant correlation between the matching of student's learning time with Chrono types, attributed to achievement of student achievement. It is possible to recommend and change the appropriate learning pattern, for example if students have Chrono type with early type, it suggested to study at night, whereas if students have Chrono type with late type, it is advisable to study at noon. The gender effect of this study cannot deduce, since there is almost no gender effect on student learning outcomes and Chrono type conformity. Both male and female students when corresponding to study time with Chrono types tend to have above-average values.

Further research that planned to focus grouping students in several case study places such as schools with student ability level, and schools with above average ability level. In contrast to this study, further research to focus assesses the effectiveness of using SCL method in some schools using interactive media. Other focus study in next research is focus according to Fisher (1995), experts distinguish two types of thinking in other referenced by Fisher, R. (1995) that is creative thinking exploratory and analytical reasoning or logic or critical.

## V. CONCLUSIONS OF RESEARCH

After a study consisting of several stages of research, this study can have concluded that. A pattern that corresponds between the learning time and the corresponding Chrono type has a trend value better than the students who do not match the time between learning with Chrono types. The gender effect of this study cannot have deduced, since there is almost no gender effect on student learning outcomes and Chrono type conformity. Both male and female students when corresponding to study time with Chrono types tend to have above average.

Suggestion for the research of knitting, research needed by focusing on the study of the level of material difficulties presented, with different respondents at the school level. Another interesting study is to examine the relationship of another variable need discussed.

## ACKNOWLEDGMENT

The authors would like to thank to the Ministry of Technology, Research, higher educations of the Republic Indonesia for funding this project, to give authors funding of research grants for the second year. Specially to LPPM (Lembaga Penelitian dan Pengabdian Masyarakat) Siliwangi University and SMPN 1 Tasikmalaya, thanks for all support and attention.

## REFERENCES

- [1] Christoph Randler, Michael Schredl, and Anja S. Goritz (2017). Chronotype, Sleep Behavior, and the Big Five Personality Factors. *journals.sagepub.com/home/sgo*.
- [2] Fisher, R. (1995). *Teaching Children to Think*. Cheltenham, United Kingdom: Stanley Thornes Ltd.
- [3] Jose Reinaldo Maximo Gomes et al., (2017). The Assessment of Medical Students' Chronotypes. *World Journal of Neuroscience. Scientific Research Publishing*.
- [4] Kuhnle, T.K. (2006). *Quantitative Analysis of Human Chronotypes*, Dissertation, University Munchen, Germany.
- [5] Lehnkering, H. and Siegmund, R., (2007). Influence of chronotype, season, and sex of subject on sleep behavior of young adults. *Chronobiology International*, 24, 875-888.
- [6] Ratnaningsih, Nani., Hidayat, Edi. & Akbar, R. Reza El. (2016). *Scientific Approach-Based of Interactive Learning Media to Improve Mathematical Thinking Skill and Self-Regulated Learning*. Proceedings of the 2nd SULE – IC 2016, FKIP, Unsri, Palembang.
- [7] Roenneberg, T., Wirz-Justice, A. and Merrow, M., (2003). Life between clocks: Daily temporal patterns of human chronotypes. *Journal of Biological Rhythms*, 18, 80-90.
- [8] Schunk, D.H. & Zimmerman, B.J. (2003). Self-regulation and learning. In Reynolds, W.M. & Miller, G.E. (Eds.), *Handbook of*

- psychology Volume 7 *Educational Psychology* (pp.59-78). John Wiley & Sons, Inc: New Jersey.
- [9] Widyanti, A. Mahachandra, M. dan Satalaksana, I.Z. (2010). *Indonesian Chronotype: Comparison between Shift Worker and University Student*, Institut Teknologi Bandung, Indonesia.
- [10] Widyanti, A., Soenaryo, I., & Akbar, R. Reza El. (2010). *Chronotype, performance and workload*.

## AUTHORS' PROFILES



**First A. Author Nani Ratnaningsih**

Is Head of research center LPPM Siliwangi University, Lecturer Department of Mathematics Education, Siliwangi University, Tasikmalaya, Indonesia. Her primary research interest is media of mathematics learning, structure of algebra, and mathematics learning strategy. Email: naniratnaningsih@unsil.ac.id



**The second B, Author R. Reza El Akbar**

Is Lecturer and Head of Informatics Engineering Department, Siliwangi University, Tasikmalaya, Indonesia. His primary research interest is Industrial and Educational Performance. Other interest in information systems Email: reza@unsil.ac.id



**The third C, Author Edi Hidayat**

Is a Lecturer in Department of Mathematics Education, Siliwangi University, Tasikmalaya, Indonesia. His primary research interest is matrices algebra, statistical, linear programing. Email: den\_aspar@yahoo.co.id