

# Analysis of how the students' behaviors in doing homework relate to their learning performance

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**Abstract:** As an important way of reinforcing learning and honing skills, homework plays a significant role in students' academic life. This study intends to investigate the relationship between the behaviors of students in doing homework (self-regulation and time spend on homework) and their academic achievements. The results show that homework self-regulation behaviors have significant effects on academic achievements yet the time spent on homework is not a convincing variable in predict students' grades. Propose a complex algorithm to classify homework behaviors and identify the learners who possibly yield poor learning performance will be our next work.

**Keywords:** Homework behavior, academic achievement, learning analytics

## 1. Introduction

Homework has always been an import role in students' academic life since K-12 education starts. While the relationship between homework and academic achievements has been discussed for years, the associations between them remains disputable. A review of early research on homework reveals, the time spent on homework has always been set as the key predictor of academic achievement. The measure of homework time is mainly acquired from the self-report of students (students were asked to answer questions like 'How long have you taken to do your homework every week?'), which may not accurately learn the time spent on homework, and therefore mislead the conclusions. This paper investigates the homework from the view of self-regulation behaviors and homework time and intends to rethink the association between homework and academic achievements.

## 2. Literature Review

### *2.1 Homework and academic achievements*

As a hot issue in education research, homework and its effect on academic achievements have always been talked. Cooper, Robinson, and Patall (2006) found mostly positive associations between homework time and achievement. Dettmers et al. (2009) conducted a multilevel analysis in 40 countries

and concluded that the relationship between homework time and the academic achievement is not universally evidenced. These previous studies on the homework-achievement relationship typically use the time spent on homework as the main predictor of academic achievement, while other important homework behaviors, such as engagement, studying attentively in a quieter environment, have been ignored (Cooper et al., 2006; Ramdass & Zimmerman, 2011). Furthermore, Plant et al. (2005) found that the amount of study time was a significant predictor of cumulative GPA only when the quality of study time and prior performance were considered. In reviewing the literature of the relationship between homework and self-regulation from the elementary grades to college, it reveals that quality measures of homework such as managing distractions, self-efficacy and perceived responsibility for learning, setting goals, self-reflection, managing time, and setting a place for homework completion are more effective than only measuring the amount of time spent on homework.

## *2.2 Self-regulation and homework*

Homework is generally done at home independently, either with or without supervision and students take responsibility to self-regulate their learning and decide where, when, how, why, and what to do with the assigned homework (Zimmerman, 1998). So self-regulation can and should be considered when measuring homework behaviors. Self-regulation is usually a convincing indicator of the behavior from the social-cognitive point of view (Zimmerman, 2000), which is defined as the thoughts, affects, and behaviors of students that are used to attain learning goals. Three areas of psychological functions essential in learning will be appointed with self-regulation, which are cognitive functions like learning strategies; motivational functions such as self-efficacy and task values; and metacognitive functions including self-monitoring and self-reflection (Bandura, 1993; Hong, Peng, & Rowell, 2009; Trautwein & Köller, 2003; Ramdass & Zimmerman, 2011). As previous researchers defined: the motivational domain of self-regulation implies that students believe in their capabilities and value homework as a task that would enhance learning. Valuing the task and having high self-efficacy for the assignment can enhance one's persistence when faced with difficulties. The cognitive component of self-regulation relates to the strategies students use to complete homework and process the information more effectively. Strategies vary depending on the homework task. For example, writing an essay requires brainstorming ideas and making an outline before writing. By contrast, solving fraction problems requires a different set of strategies. Metacognition component refers students set goals and monitor their progress as they complete homework assignments (Pintrich, 2000). Students engage in metacognition when they reflect on why they do not understand a text or a problem during homework completion and use strategies such as rereading the text or seeking help in solving the problem (Ramdass & Zimmerman, 2011). Obviously, homework behavior is closely associated with these three components of self-regulation. Students' self-beliefs, expectations of success, task value, strategy use, and self-monitoring influence homework behavior and learning (Trautwein & Köller, 2003).

There are few studies focusing on the homework self-regulation as an indicator of homework behavior when study homework-achievement relationship. Zimmerman and Kitsantas (2005) examined the mediational role of self-efficacy for learning and perceived responsibility beliefs between students' homework reports and their academic achievement. In their research, participants consisted of 179 high school girls from a parochial school who had 3 hours of homework daily. The measures were a personal data questionnaire and a homework survey that measured the quantity and quality of homework. The results implies that the use of self-regulatory strategies when complete assignments can predict student

GPA at the end of the academic semester. Hong, Peng, & Rowell (2009) defined homework self-regulation with three components including task value, motivational outcome, and metacognitive strategy. In this research, participants are 368 seventh graders and 437 eleventh graders from four schools, which are similar in student achievement and socioeconomic status. A self-assessment questionnaire was conducted to measure students' homework utility value, intrinsic value, effort, persistence, planning, and self-checking applied during homework process. The results found that the differences of these indicators had relationship with the difference of the students' achievement levels.

Based on previous study, this paper tries to survey the homework from the view of homework time and homework self-regulation behaviors. Homework self-regulation behaviors, according to Zimmerman's theory, are split into three components: motivational domain (task value and self-efficacy), cognitive component (learning strategies and self-evaluate) and metacognition component (self-reflect).

### **3. Method**

#### *3.1 Participants*

The study was conducted in an elementary school in East China, as part of an ongoing learning analytics project, to model students' learning behaviors within a learning technology system. Fourteen classes of 400 students range from Grade 4 to Grade 5 were involved in this research.

#### *3.2 Instrument*

The students' homework behaviors were approximated to the variables of their self-regulation and the time spent on doing homework. The self-regulations of students on their homework were measured with a self-assessment questionnaire. The questionnaire consist 20 items and include 6 factors: task value, self-efficacy, learning strategies, self-monitoring, self-evaluate and self-reflect. 400 students were the initial sample. After inspecting their completed questionnaires, 12 from Grade 4 and 11 from Grade 5 were eliminated due to the following issues: not completing a page or two, showing insincerity in their responses (e.g., all "5"s on one page), missing final examination scores, or multivariate outliers (20 cases), leaving 357 available data.

Students' daily homework time is collected from the learning technology system. All the homework time were counted by their mean value. Meanwhile, students' final test scores of Math, Chinese and English are collected as the indicators of their academic achievements.

### **4. Results and analysis**

#### *4.1 Homework self-regulation and academic achievements*

As below the table 1 shows, all the homework self-regulation behaviors significantly relate to the students' academic achievements. Specifically, task value has positive correlation with scores of Chinese, Math and English, which means that a highly value on homework task contributes to desired

grades. While when it comes to self-efficacy, a negative correlation was found. In another word, a highly self-efficacy on homework somehow would relate to students' low scores. Learning strategies and self-reflect share the same negative correlation with grades. But learning strategies only has significant negative effects on Math scores and self-reflect on English scores. Self-evaluation is positively and significantly relates to Math and English grades, which means that self-check and evaluate your homework is helpful to students' academic achievements when finishing homework.

**Table 1: homework self-regulation and academic achievements.**

	Chinese	Math	English
Task value	.156**	.114*	.184**
Pearson Correlation	.003	.032	.000
Self-efficacy	-.094	-.104*	-.113*
Pearson Correlation	.075	.050	.033
Learning strategies	-.061	-.108*	-.078
Pearson Correlation	.248	.041	.140
Self-evaluation	.085	.111*	.131*
Pearson Correlation	.107	.036	.013
Self-reflect	-.059	-.076	-.107*
Pearson Correlation	.262	.153	.043

\*  $p < .05$  \*\*  $p < .01$

#### *4.2 Homework time and academic achievements*

However, no significant relationship was found between the time spend on the homework and student's academic achievements in the study so far.

### **5. Conclusions and future work**

This paper intends to explore how the behavior of doing homework relates to their academic achievement. Self-regulation behaviors were introduced in analyzing homework behaviors. The results show that homework self-regulation behaviors are all significantly related to students' grades. Behaviors such as task value and self-evaluation are positive to students' scores. While self-efficacy, learning strategies and self-reflect behaviors are negative. Time on homework alone has no significant effects on grades. Our next work is to classify students by their homework behaviors and find a regression model to predict students' grades and finally help identify the learners who possibly yield poor learning performance

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