RELATIONS BETWEEN INSTRUCTOR FEEDBACK, SELF-REGULATION, ASSIGNMENT COMPLETION AND ACADEMIC ACHIEVEMENT IN THAI HIGHER LEARNING INSTITUTIONS

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ABSTRACT

Purpose – Assignments have been linked with various benefits, including a higher quality of learning and academic achievement. The purpose of this study was to explore the relationship between assignment completion and academic achievement in higher education. Specifically, it investigated the impact of instructor feedback and three constructs of self-regulation (self-efficacy, time management, and help-seeking) on assignment completion (time spent on assignments and number of assignments completed) and academic achievement.

Methodology – The study employed a correlational research design and a self-report survey. Data was collected from 1,106 undergraduate students in six

universities in Thailand through a convenience sampling approach. Structural equation modelling was used to establish the strength of the relationships among the constructs of the model.

Findings – The number of assignments completed was found to have a strong association with academic achievement. Time management was the strongest predictor of the number of assignments completed as well as time spent on assignments. Time management was also the mediator between self-efficacy and the number of assignments completed. However, help-seeking was negatively associated with both the number of assignments completed and academic achievement.

Significance – These results have educational implications, and should be helpful for instructors, instructional designers and educators who may use the information to offer undergraduate students appropriate learning tools, strategies and environments for supporting assignment completion and academic achievement.

Keywords: Academic achievement, assignment completion, help-seeking, Thai higher education, time management, self-efficacy.

INTRODUCTION

Homework assignments have been viewed as a helpful practice for centuries, and are integrated into the learning and assessment of most academic courses (Vatterott, 2018). Instructors often use assignments, including homework, as an instructional tool for reflection, and for determining students' learning. Studies conducted at the post-secondary level have concluded that homework assignments help students to promote the quality of their learning (Zhu & Leung, 2012), check their understanding of course materials (Koban et al., 2020), recall old materials (Beagley & Capaldi, 2020) and learn from their mistakes (Grodner & Rupp, 2013). In Thai higher education, research evidence supports the significance of homework assignments. Thai students perceive homework assignments in terms of maintaining their learning and acquisition of knowledge and skills (Songsirisak & Jitpranee, 2019). Past studies confirm that college students who complete more assignments are more likely to gain higher academic accomplishment (Planchard et al., 2015; Ratniyom et al., 2019). Therefore, assignments are often at the centre of courses and university policies because of their importance (Doyle, 2008); most universities implement a policy on incomplete or late submission of assignments that would affect students' academic performance.

Notwithstanding, assignment completion may be challenging for undergraduate students who are faced with difficulties in controlling their self-study (van der Meer et al., 2010; Nilson, 2013). Some students cannot complete assignments because of various obstacles (Dembo, 2013; Kaewkeaw, 2015). Li et al. (2018) found that 25 percent of freshmen in the United States undertaking engineering courses completed less than 80 percent of homework because of poor time management. Some college students encounter multiple, complex and prolonged tasks, leading to a poorly balanced workload (Ragupathi & McMorran, 2016) and uncompleted homework assignments (Kaewkeaw, 2015; Planchard et al., 2015). In Thailand, Intrayut et al. (2013) reported problematic behaviours in undertaking homework assignments. Due to the inability to complete homework assignments by themselves, some Thai students prefer to copy assignments from friends. Songsirisak and Jitpranee (2019) found that plagiarism in assignments occurred at a rate of about 40 percent among Thai students. Hence, they recommended that students should know "how to complete their tasks by not copying others" (Songsirisak & Jitpranee, 2019, p. 14). For these reasons, the purpose of this study was to seek an understanding of factors that improve assignment completion among undergraduate students, which in turn, should enhance their academic achievement, in line with related theory and empirical literature.

Previous studies have established that assignment completion, in terms of the number of assignments completed and time spent on assignments, is associated with academic achievement (Kontur et al., 2015; Planchard et al., 2015; Trout, 2018). However, few studies have investigated this relationship in higher education. Besides, most of the research thus far has been conducted in the USA with small samples and in specific subject areas. For instance, Planchard et al. (2015) investigated homework among 31 students studying genetics. Their results indicated that homework completed had a positive influence on academic achievement. Kitsantas and Zimmerman (2009) assessed 223 college students, also in the USA. They found that homework quality (i.e., the amount of homework completed) positively influenced students' grades. Cook (2018), on the other hand, found that devoting more time to homework led to lower grades in a biology course. The current study aimed to fill the gap in knowledge about this relationship with regards to Asian undergraduates, particularly Thai students, in an interdisciplinary context.

In general, homework is defined as "tasks assigned to students by school teachers that are meant to be carried out during non-school hours" (Cooper, 1989, p. 7). In the present study, however, assignments refer to homework or coursework assigned by university instructors, either inside or outside the

classroom. These assignments may be used for the purpose of evaluating students' outcomes and as part of the final course grade.

THEORETICAL FRAMEWORK

The theoretical background of the current research is self-regulation theory, which refers to the process of generating and maintaining thoughts, feelings and actions. This process is planned and cyclically applied for the accomplishment of individual goals (Zimmerman, 2000) such as assignment or coursework completion (Locke & Latham, 1991). Evidence of self-regulation has been documented in relation to homework assignments. For instance, Bembenutty and Zimmerman (2003) revealed that at-risk college students who participated in a programme of self-regulation were more apt to complete homework. Using the self-regulatory process is essential to increase deep engagement with homework and to lessen the delay of gratification (Steiner, 2016).

The present study, based on Zimmerman and Moylan's (2009) model, is rooted in a social cognitive perspective. Zimmerman and Moylan propose three cyclic phases of self-regulation: forethought, performance and reflection. The forethought phase involves the preparation and use of motivation, action and strategies employed towards the performance phase. Believing in one's own abilities to put in an effective performance toward specific tasks leads to performing the tasks effectively. Self-efficacy is a part of motivational belief for decisions to engage in specific tasks and for behaviour guidance applied to achieve the goal (Eccles & Wigfield, 2002). The performance phase is an implementation of planning that involves using strategies toward the tasks effectively (Schunk & Greene, 2017). Students need to utilise different strategies such as time management and help-seeking (Zimmerman & Moylan, 2009) to focus on their tasks and eliminate distractions (Zimmerman, 2000). The third phase is self-reflection. It refers to evaluating personal performance and reviewing one's own behaviour affecting the outcomes (Zimmerman, 2000). This study focuses on three constructs of self-regulation, namely time management, help-seeking and self-efficacy, to support assignment completion. Evidence suggests that each of these three factors of self-regulation would have an enormous influence on students' assignment completion (Hong et al., 2016; Li et al., 2018) and academic achievement (Bembenutty & White, 2013).

According to self-regulation literature, one of the factors that makes self-regulation more effective is reliance on the social component such as instructors and parents to control individual actions and thoughts (Schunk &

Usher, 2017). Hence, assignment completion and the cyclical process may be influenced by monitoring from adults. For example, instructors offer verbal or written praise such as "excellent" or "great" on homework completed (Letterman, 2013). Nevertheless, as empirical evidence suggests that parents are less involved in college homework assignments (Letterman, 2013), the present study only looks at instructor feedback.

LITERATURE REVIEW

Assignment Completion

Assignments are commonly positively related to academic achievement. In the online learning context, Richards-Babb et al. (2011) used homework instead of quizzes to examine the success rate in a chemistry course. They found that homework can enhance the success rate, as measured by grades. Similarly, Ratniyom et al. (2019) reported that online homework scores positively affected students' grades in the Thai context. Phumchumphon (2006) investigated the components of good homework assignments in many subject areas and explored the impact of homework assignments on learning achievement among high school students. They reported that homework assignment procedures, including doing them, impacted students' academic achievement. In the current study, assignment completion refers to two aspects: the number of assignments completed and the time spent on assignments.

There are currently a limited number of studies on assignment completion conducted in higher education. Many of these have been conducted in the USA (e.g., Kontur et al., 2015; Li et al., 2018), and in specific subject areas such as biology (Cook, 2018) and genetics (Planchard et al., 2015). Several factors have been identified as influencing the amount of homework students completed and the time spent on homework. These include time management (Li et al., 2018), motivation (Planchard et al., 2015), aptitude (Kontur et al., 2015), class duration and instructor evaluations (Trout, 2018), and delay of gratification and self-regulation (Bembenutty & Zimmerman, 2003). However, Songsirisak and Jitpranee (2019) observe that there is still a shortage of homework assignment research within the Thai context, and that previous studies have focused on elementary and secondary school levels.

Time Management and Help-Seeking

Time management involves setting, planning and managing time to accomplish academic tasks on time (Zimmerman & Moylan, 2009). Over 60 percent of the

students in Songsirisak and Jitpranee (2019)'s study reported that homework assignments could not be an obstacle in managing their free time. Good time management can improve academic success (Kitsantas, Cheema & Wave, 2008). Students would better understand the content by spending more quality time on tasks. Li et al. (2018) found that poor time management skills led to a lower amount of homework completed. Studies conducted at the high school level also attach great importance to time management. For example, Xu (2011) pointed out that homework management, including managing time, plays a positive role in the amount of homework completed. Xu et al. (2014) identified that time management also impacted the time spent on homework.

Help-seeking is another key self-regulation strategy deemed significant for achieving specific performance. Bembenutty and White (2013) suggest that the self-regulation process brings about effectiveness in homework completion among college students. Students may need to seek some assistance to be able to complete their tasks or to achieve satisfactory performance (Karabenick & Dembo, 2011), especially low-ability students (Koban et al., 2020). Thai students who encounter difficulty in doing assignments also tend to require help from their peers (Songsirisak & Jitpranee, 2019). However, no study has examined the relationship between help-seeking and assignment completion in higher education.

Self-Efficacy

Self-efficacy is described as beliefs about individuals' competence to plan, arrange and perform a particular goal (Schunk & Greene, 2017). If students are certain of their capability, they tend to endeavour to perform given tasks better (Schunk & Greene, 2017) and achieve higher academic success (Siriparp, 2015) as well as better performance (Hetthong & Teo, 2013). Research in both high school and higher education contexts has discovered that self-efficacy strongly influences homework achievement, including homework completion (Bembenutty & Zimmerman, 2003; Hong et al., 2016). Self-efficacy has been found to be weakly related to time spent on mathematics homework in secondary school (Kitsantas et al., 2011). Self-efficacy not only plays a significant role in achieving homework completion, but also has an association with self-regulated strategies (Abdullah, 2016). It also links positively with time management among college students with low grades or low college entrance scores (Bembenutty, 2009). Similarly, research has also indicated that Thai students with high self-efficacy often use self-regulatory strategies, including time management and help-seeking (Thongnoum, 2002). With regards to help-seeking, a positive association has been found between academic self-efficacy and help-seeking in secondary schools (Sharma &

Nasa, 2016). However, recent evidence has revealed a negative relationship (Williams & Takaku, 2011) or no relationship (Sakiz, 2011) between self-efficacy and help-seeking among college students.

Instructor Feedback

Many studies on instructor feedback in Thailand have focused on writing development (e.g., Tangkiengsirisin & Kalra, 2016). However, investigations of homework assignments within the general area of instructor feedback are limited in number. Most of the literature on homework assignment behaviours have been based on investigations at elementary and secondary levels (e.g., Núñez et al., 2015; Xu, 2011). Núñez et al. (2015) demonstrated that providing feedback raised the amount of homework completed and the quality of homework time management. Their results also found no association between teacher feedback and time spent on homework. In higher education, instructor feedback also helps students to raise their academic performance (Brown et al. 2016). Feedback from instructors enables students to cope better with time management (Steiner, 2016) and self-efficacy (Brown et al., 2016). Teacher feedback and encouragement can strengthen students' self-efficacy (Schunk & Greene, 2017) and navigate students' further learning (Brown et al., 2016).

Considering the literature to date, the current study is quite distinct in that it concentrated on multiple factors associated with assignment completion and academic achievement. The study was conducted outside the USA, with a larger sample. Furthermore, it addressed the gaps in previous studies on homework, many of which have been conducted at secondary and elementary levels as opposed to post-secondary level. See Bas, Senturk and Cigerci (2017) for a review of literature on homework at secondary and elementary levels). Accordingly, this study explored the associations of academic achievement, number of assignments completed, time spent on assignments, time management, help-seeking, self-efficacy and instructor feedback.

The following research questions were shaped based on background theory and literature, as illustrated in Figure 1:
- What are the relationships between instructor feedback, students' self-efficacy, time management, help-seeking, time spent on assignments, number of assignments completed and academic achievement?
- What aspects of instructor feedback, self-efficacy, help-seeking, time management, time spent on assignment and number of assignments completed influence academic achievement among undergraduate students?

Figure 1. *The theoretical framework that shaped the research questions.*
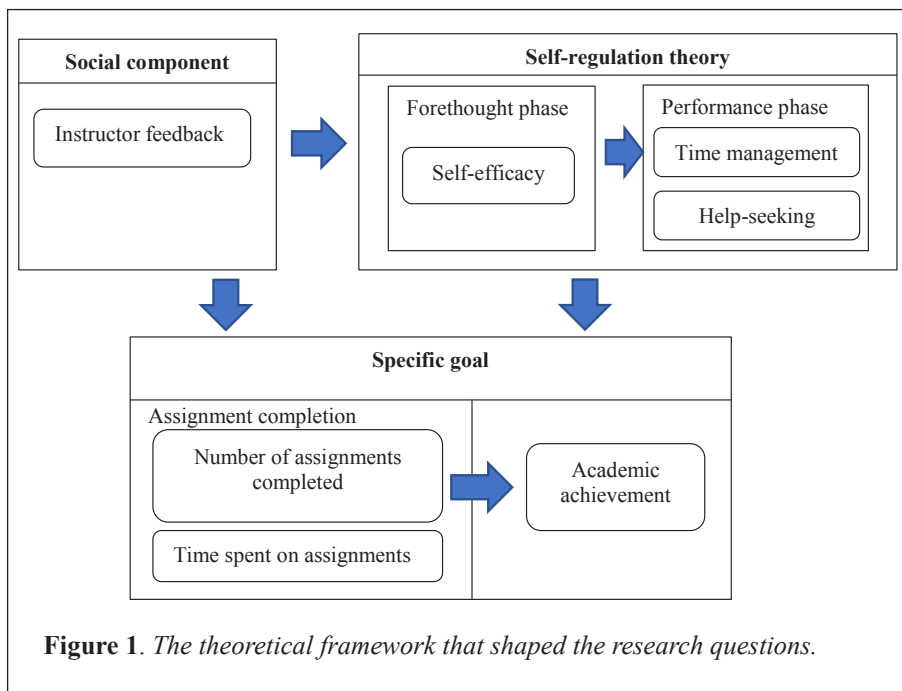
METHODOLOGY

Participants

The study focused on investigating the influence of multiple factors on assignment completion and academic achievement among undergraduate students as a whole. When using path analysis to answer research questions, the minimum sample size should be more than 500 participants, based on a complexity model with numerous constructs (>7) (Hair et al. 2010). This study involved 1,106 undergraduates, 405 males (37%) and 701 females (63%) from first year to fourth year, from six universities in Thailand. The participants were chosen using a convenience sampling approach. They were studying in different majors relating to science (61%) and social studies (49%), such as education, humanities and social science.

Measures

The study was based on a self-report survey to measure students' perceptions regarding six constructs: instructor feedback, self-efficacy, time management, help seeking, time spent on assignments and number of assignments completed. The survey comprised nineteen items, excluding gender, academic major and

GPA, adapted from widely used measures in relevant past research. Three language experts used the back-translation method to translate the English items into Thai. Then, a pilot study involving 300 participants was conducted.

Constructs

Instructor feedback (IF)
IF included three items referring to feedback provided by instructors on students' assignments. The items and scale (α=.67) were adapted from Xu (2011). An example of an IF item is "My instructor checks this much of my assignments…"

Self-efficacy (SE)
SE was measured in terms of perceiving students' abilities in doing assignments. Five items (α=.83) from the Patterns of Adaptive Learning Scales (Midgley et al., 2000) were utilised. The rating scale ranged from 5 (very confident) to 1 (not confident at all). An example of an SE item is "I am certain I can figure out how to do the most difficult assignments."

Help-seeking (HS)
HS was measured by two items adapted from the Motivated Strategies for Learning Questionnaire (Pintrich, 1991; α=.72). Students were asked about perceptions on seeking help from other people, or sources of help when facing obstacles while doing assignments (e.g., "When I cannot understand the material in assignments, I ask another student in this class for help").

Time management (TM)
TM comprised four items to assess how well students managed their time and schedules when doing assignments (α=.76). The items were from the Homework Management Scale (HMS; Xu, 2008). An example of a TM item is "I prioritise my work and plan in advance."

Number of assignments completed (NC)
Students were asked to report NC only in their major academic subject (α=.66). Three items, borrowed from Xu (2011) assessed how often students completed this number of assignments. IF, HS, TM, and NC items were measured using a five-point Likert scale from 1 to 5, denoting none to all, respectively.

Time spent on assignments (TS)
Three items from Xu (2011) were used to measure TS, specifically the amount of time spent on assignment completion daily, in a typical week and on a typical weekend (α=.66). These three items were measured on a Likert type scale of 1 to 5 (5 = more than 2 hours; 4 = between 1.30 and 2 hours; 3 = between 1 and 1.30 hours; 2 = between 30 minutes and 1 hour; and 1 = less than 30 minutes).

Academic achievement (AA)

AA was derived from students' self-report of their GPA in the previous semester, based on the following scale: 5 =3.51 – 4.00, 4= 3.01 – 3.50, 3= 2.51 – 3.00, 2 = 2.00 – 2.50, and 1= less than 2.00.

Procedure

The principal investigator gained approval from the universities to collect data from the respondents. Before responding to the survey, the students were informed about the meaning of each construct, the definition of assignments, how to respond and their participation in this study as volunteers. Any student could refuse to participate, without any repercussions. To ensure that they were comfortable and able to provide their most truthful perception, the participants answered the questions on paper anonymously. They spent fifteen to thirty minutes to complete the survey in their major academic class.

Data Analysis

The study employed both descriptive and inferential statistics. Descriptive statistics provided information for checking assumptions; Pearson correlations allowed for the evaluation of interrelationships and multicollinearity; and the relationship between observed and latent variables was identified using Confirmatory Factor Analysis (CFA). This also provided information about the validity and reliability of the measurement model. Structural Equation Modelling (SEM) was used to assess the dataset to discover the strength of the relationships among latent variables in the model.

Construct validity of the measurement model was analysed through CFA. It comprised two dimensions: convergent and divergent validity. The indicators of convergent validity are Average Variance Extracted (AVE) and Construct Reliability (CR). Based on the rule of thumb, the standard value of AVE should be higher than .5, while CR should be greater than .69 for good reliability, or between .6 and .7 for acceptable reliability (Hair et al., 2010). For discriminant validity, a comparison of the AVEs with the Maximum Shared Variance (MSV) and Average Shared Variance (ASV) was conducted. All AVEs of each construct should be higher than their MSV and ASV (Fornell & Larcker, 1981).

SEM allows for the evaluation of a structural relationship among six constructs and an observed variable. These results could explain the effects of each relation, including direct, indirect, and total effects, strongest predictors, and intervening variables. Bootstrapping was used to "assume the symmetry

or normality of the sampling distribution of the indirect effect" (Preacher & Hayes, 2008, p. 884). This study bootstrapped 3,000 samples with 95 percent confidence interval to observe the significance of indirect effects. Nevertheless, Hair et al. (2010) suggested cut-off points of good fit indices to assess the validity of a structural model: if the number of samples was above 250 and the number of observed variables was between 13 to 29 items, the value indices should be X^2 = significant, RMSEA < .07 with CFI/TLI >.92. In the same way as SEM, CFA values were determined based on these criteria.

RESULTS

Scale Validation

Before the SEM analysis, the measurement of construct validity and reliability were performed by CFA and Cronbach's alpha, as shown in Table 1. The CFA model provided goodness of fit indices measured by the X^2(136, 1,106) = 253.69, RMSEA of .03, CFI of .98, and TLI of .97. The assessment of reliability indicated acceptable Cronbach's values for all constructs (α = 0.72-0.83) except IF, TS, and NC. These three constructs showed low reliability, perhaps because the constructs had few items. Taber (2018) suggested that alpha tends to increase with the increase in the number of instrument items. However, the internal consistency of all constructs was also checked by CR, and represented acceptable reliability. AVEs of NC, TS and HS were above or equal to .5. Another scale (IF, SE, and TM) of AVEs had an adequate value for convergent validity, as Fornell and Larcker (1981) recommended that when AVE is below 0.5 but CR is greater than 0.6, the convergent validity of the construct is still acceptable. When comparing the AVEs of each construct with their CR, the results showed that the CR of each construct was greater than their AVE. The results of divergent validity indicated that all AVEs for the individual construct were higher than their MSV and ASV, leading to a real difference in a construct from other constructs.

Table 1

Construct Validity and Reliability of the Study

Constructs	Cronbach's alpha	Reliability	Convergent validity		Divergent validity/ Discriminant validity			
		CR	AVE	CR>AVE	MSV	ASV	MSV<AVE	ASV<AVE
1. Instructor feedback	0.67	0.68	0.42	✓	0.16	0.09	✓	✓

(continued)

Constructs	Cronbach's alpha	Reliability	Convergent validity		Divergent validity/ Discriminant validity				
		CR	AVE	CR>AVE	MSV	ASV	MSV<AVE	ASV<AVE
2. Self-efficacy	0.83	0.82	0.49	✓	0.15	0.07	✓	✓
3. Help-seeking	0.72	0.72	0.56	✓	0.16	0.06	✓	✓
4. Time-management	0.76	0.77	0.45	✓	0.16	0.14	✓	✓
5. Time spent on assignments	0.66	0.67	0.50	✓	0.07	0.03	✓	✓
6. Number of assignments completed	0.66	0.67	0.50	✓	0.16	0.07	✓	✓

Note: CR = Construct Reliability, AVE = Average Variance Extracted, MSV = Maximum Shared Variance, ASV = Average Shared Variance

Descriptive Statistics and Correlations

The correlations and descriptive statistics for all constructs are listed in Table 2. From the assumption analysis, there was no missing data; violations of normality did not appear in terms of skewness and kurtosis (from .11 to .87 absolutely). Multivariate outliers were checked by Mahalanobis distance, and 13 outliers were found and deleted from the dataset. Pearson correlations were used to evaluate the relationship of all constructs, and results ranged from weak to moderate relationships $(r = 0.06 – 0.31)$, representing non-multicollinearity (Hair et al., 2010). Among the constructs, IF and TM had the strongest relationship $(r = .31, p <.001)$. The constructs shared 9.67% of their variances, representing a medium effect (Cohen, Manion & Morrison, 2018). HS had the lowest significance related to NC, $r = .06, p <.05$. The constructs shared .40% of their variances, representing a small effect. All constructs were associated with each other except for two pairs: SE and TS; and HS and AA.

Table 2

Descriptive Statistics and Correlations among Latent Variables

Construct	1	2	3	4	5	6	7
1. Instructor feedback (IF)	1	-	-	-	-	-	-
2. Self-efficacy (SE)	.26***	1	-	-	-	-	-
3. Help-seeking (HS)	.20***	.13***	1	-	-	-	-
4. Time management (TM)	.31***	.30***	.30***	1	-	-	-
5. Time spent on assignments (TS)	.08**	.06	.10**	.17***	1	-	-
6. Number of assignments Completed (NC)	.20***	.10**	.06*	.29***	.17***	1	-

(continued)

Construct	1	2	3	4	5	6	7
7. Academic achievement (AA)	.15***	.11***	-.01	.20***	.13***	.35***	1
Mean	4.03	3.57	3.78	3.96	3.77	4.11	3.52
SD	.64	.62	.71	.59	.86	.79	1.00
Skewness	-.60	-.11	-.31	-.40	-.54	-.87	-.21
Kurtosis	.42	-.20	.19	.27	-.22	.61	-.74

* *p* < .05, ** *p* < .01, *** *p* < .001

SEM Analysis

The SEM approach was used to estimate multiple and interrelated associations pertaining to the second research question. The study identified SE, HS, TM, TS, and NC measures as independent, dependent or intervening variables, IF as an independent variable, and AA as a dependent variable.

The results of the SEM are illustrated in Figure 2. Using Maximum Likelihood methods, the statistics presented an excellent overall model fit, in which all values were within the criteria relating to a good model fit. The X^2 value was 280.51 with 149 degrees of freedom (*p* < .001), normed X^2 = 1.88, and RMSEA = 0.03 with a 90% confidence interval of .02 to .03. Other values showed CFI of .98 and TLI of .97.

* *p* < .05, ** *p* < .01, *** *p* < .001

Note: A. = Assignments

Figure 2. *Standardised path coefficients and loading estimates of the model.*
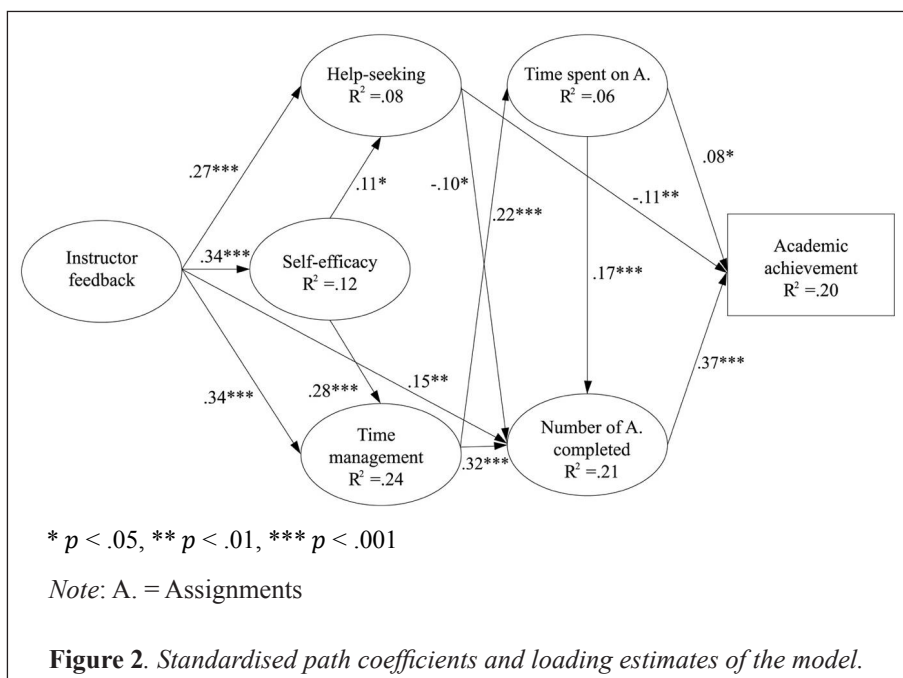
Direct effects

The strongest total effect on AA was NC (β = .37, p < .001). TS related positively to AA (β = .08, p < .05), while HS had a negative association (β = -.11, p < .01). For NC and TS as dependent variables, TM was the strongest predictor (β = .38, p < .001; β = .22, p < .001, respectively). The findings also demonstrated that IF also strongly predicted TM (β = .41, p < .001), compared with HS (β = .23, p < .001) and SE (β = .34, p < .001). The influences of SE on HS and TM were statistically significant.

Indirect effects

The association between TM and AA was mediated (β = .16, p < .001) by TS and NC. IF (β = .13, p < .001) and SE (β = .08, p < .05) had an indirect effect on AA with TM and HS as a mediator. Relating to NC and TS, both TM and HS were intervening variables between SE and NC (β = .10, p < .001). IF and SE had an indirect effect on TS through TM as an intervening variable. Table 3 summarizes the direct, indirect and total effects in the model.

SEM further demonstrated a medium effect size for AA (Cohen et al., 2018), explaining 20.4 percent of variability with NC, TS, and HS. The model accounted for 21.3 percent and 5.9 percent of the variance in NC and TS, indicating medium and small effect sizes, respectively. The effect size of the variance in HS (R^2=.08), TM (R^2=.24), SE (R^2=.12) was small, medium, and small, respectively.

Table 3

Direct, Indirect and Total Effects

Effect		Standardized coefficient (β)		
Independent variable	Dependent variable	Direct	Indirect	Total
Instructor feedback	Self-efficacy	.34***	-	.34***
Instructor feedback	Help-seeking	.23***	.04*	.26***
Self-efficacy	Help-seeking	.11*		.11*
Instructor feedback	Time management	.31***	.10***	.41***
Self-efficacy	Time management	.28***	-	.28***
Instructor feedback	Time spent on assignments	-	.09***	.09***
Self-efficacy	Time spent on assignments	-	.07***	.07***
Time management	Time spent on assignments	.22***	-	.22***

(continued)

Effect		Standardized coefficient (β)		
Independent variable	Dependent variable	Direct	Indirect	Total
Instructor feedback	Number of assignments completed	.15**	.13***	.28***
Self-efficacy	Number of assignments completed	-	.10***	.10***
Help-seeking	Number of assignments completed	-.10*	-	-.10*
Time management	Number of assignments completed	.34***	.04***	.38**
Time spent on assignments	Number of assignments completed	.17***	-	.17***
Instructor feedback	Academic achievement	-	.13***	.13***
Self-efficacy	Academic achievement	-	.08*	.08*
Help-seeking	Academic achievement	-.11**	-	-.11**
Time management	Academic achievement	-	.16***	.16***
Time spent on assignments	Academic achievement	.08*	.07***	.14***
Number of assignments completed	Academic achievement	.37***	-	.37***

* $p < .05$, ** $p < .01$, *** $p < .001$

DISCUSSION

This study found that both number of assignments completed and time spent on assignments had a positive relationship with academic achievement. In terms of number of assignments completed, the finding is consistent with Grodner and Rupp (2013) and Planchard et al. (2015), who discovered that students who completed homework assignments typically had higher test performance. The number of assignments completed possibly contributed to better scores on examinations as students would have had more opportunities to review their understanding and misconceptions of the content (Grodner & Rupp, 2013). Meanwhile, the result in relation to time spent on assignments is inconsistent with some prior research in postsecondary (Cook, 2018) and secondary education (Núñez et al., 2015; Trautwein et al., 2009). For example, Cook's (2018) data revealed that an overall decline in course grade tended to raise the amount of time spent on homework, except for a middle course grade. This issue has been debated in various studies on homework assignments, although the results have been distinctive, i.e. positive, negative, and no significant results. A likely explanation for the results is that if students took considerable time on assignments, they were more likely to be clear about their conceptions of the content and knowledge (Richards-Babb et al., 2011).

Surprisingly, an inverse relationship between help seeking and academic achievement was found in the current study. The finding is interesting in that it is incongruent with most of the past research. For instance, Bembenutty and White (2013) found that adaptive help-seeking served as an effective strategy for boosting final course grades. Butler (2006) noted that low-achieving students were less likely to ask for assistance for fear of being considered dumb compared with those with high academic achievement. However, our results may be explained by Komarraju and Nadler (2013), who suggested that students with higher GPAs were less likely to find assistance because they devoted their effort to regulation and carried on with their course work even when it was difficult or tedious.

The study also found predictions of other constructs, i.e., instructor feedback, self-efficacy and time management, on academic achievement through number of assignments completed as an intervening variable. Students with high instructor feedback, self-efficacy and time management were better able to constitute academic achievement when they could finish their assignments on time. Self-efficacy is known to promote students' grades (Bembenutty & White, 2013). Thus, this study took into account the number of assignments completed as a crucial factor for supporting academic achievement. Nonetheless, instructor feedback (Brown et al., 2016), self-efficacy (Komarraju & Nadler, 2013) and time management (Kitsantas et al., 2008) still directly affected academic achievement. Webb and Moallem's (2016) study demonstrated that students who received more positive comments from instructors tended to have higher academic performance.

With reference to the number of assignments completed as a dependent variable, time management was its strongest predictor compared with instructor feedback, help seeking, and time spent on assignments. This finding is congruent with self-regulation theory and prior research. Self-regulation theory claims that applying effective strategies on tasks helps students resist distractions (Zimmerman & Moylan, 2009). Strategies such as time management can prevent students from procrastinating and help them to finish academic tasks by the due date (Wolterset al., 2017). Planchard et al. (2015) indicated that time commitment helps students to deal with complicated tasks or tasks that consume too much time. As for the other constructs, our findings seem to be in agreement with studies conducted at the secondary school level: the number of assignments completed was predicted by instructor feedback (Xu, 2011) and time spent on assignments (Núñez et al., 2015). It was also found that self-efficacy indirectly impacted on the number of assignments completed. This finding is consistent with self-regulation theory and previous studies (Bembenutty & Zimmerman, 2003; Hong et al., 2016) that have shown

that self-efficacy could assist students in completing homework. However, based on the theory, it is suggested that self-efficacy requires time management for assignments to be completed.

Another finding was that help seeking not only affected academic achievement negatively, but also the number of assignments completed. This result should be considered carefully and be applied in learning environments similar to this study. Conversely however, it may be interpreted that students with low number of assignments completed often require assistance because they are unable to complete their assignments by themselves (Koban et al., 2020). As there are few studies on the effect of help seeking on the number of assignments completed, this result provides new evidence for higher education.

The results also showed that time management was a predictor of time spent on assignments. This is partially consistent with Xu et al. (2014), who found that spending more time on homework was linked with better time management at the class level. However, time management negatively impacted time spent on assignments at the student level. Our findings also showed that instructor feedback and self-efficacy indirectly influenced time spent on assignments. With regards to self-efficacy, this finding is consistent with the self-regulation process in the forethought and performance phases (Zimmerman & Moylan, 2009). Self-efficacy can assist students in acquiring effective performance such as time management. Pertaining to instructor feedback, however, results were inconsistent with Núñez et al. (2015), who found that teacher feedback was not a predictor of time spent doing homework. This finding may suggest that instructor feedback and self-efficacy alone may be insufficient to increase time spent on assignments, and therefore, should be combined with time management to help students spend more time on assignments. Accordingly, time management is essential to support both number of assignments completed as well as time spent on assignments.

LIMITATIONS AND IMPLICATIONS

Some limitations of the current study should be noted in order to consider their implications and future research directions. This study was based on self-reported measures, which serve as a flexible method of collecting evidence on various aspects of human behaviour. Nevertheless, inaccurate responses may be a disadvantage. For example, respondents can report their own behaviours in a positive light (Vanderstoep & Johnson, 2009). In addition, some constructs had only two items; although acceptable, this may be considered as technically problematic. As this study used a quantitative measure, further studies may

consider using other instruments such as interviews and observations to gain more in-depth knowledge. The variables in the current study deserve more scrutiny to obtain insights into how students manage their time and why help-seeking negatively affected the number of assignments completed and academic achievement.

The results of this study are relative to the Thai environment and assignments were perceived as a major issue for the participants. Thus, assignments were explored with an overall view from various subject areas such as computing and foreign languages. Although assignments in the study represented both formative and summative assessments that were included in the final grade, proportions of homework assessment may vary, depending on a particular course. Future studies could investigate a particular academic area (e.g., computer engineering) as well as identify the proportion of homework assessment in a specific course.

The current findings lead to a consideration of their educational implications. Assignment completion is not only a significant factor to drive students' academic achievement, but also to improve self-regulation, which are important strategies for overcoming obstacles in postsecondary school environments (Hensley et al., 2015). The results contribute original insights into the homework assignment issue in Thai higher education. No research so far has focused on the complex associations between instructor feedback, factors of self-regulation, assignment completion, and academic achievement concurrently. In addition, this study produced different results regarding help seeking, compared with other studies. Thus, instructors may employ such information to better understand the factors influencing assignment completion and academic achievement so that they can develop more suitable teaching approaches for their students.

Having strong time management can increase the number of assignments completed. Instructional designers and instructors, therefore, may promote time management skills via teaching tactics such as using planners to make "goals and ranking activities in terms of importance" (Hensley et al., 2018, p. 117). Bembenutty and White (2013) suggested the use of homework logs to record data relating to homework, and instructors can offer students feedback. Collis et al. (2001) affirmed that providing feedback is useful not only for face-to-face assignments, but also web-based assignments. Instructors can use 'model answers' from the computer and use peer feedback to save instructors' time.

Self-efficacy was found to be a significant factor that supports the number of assignments completed and academic achievement. Instructors should design purposeful assignments to encourage students to recognise their abilities. The

results also provide unique knowledge of the relationship of help seeking to number of assignments completed and academic achievement for Asian students, specifically for Thai students. The present findings showed that the more students sought help, the lower their academic achievement and number of assignments completed, suggesting that instructors should pay attention to help-seeking behaviour. When students ask for assistance often, it might indicate that they cannot undertake the assignments by themselves. Mostly, these students are lower academic achievers and do not understand the content. Instructors can use information search, which is a type of help seeking, to provide task-related information as an initiative for requiring assistance and to help students to complete their assignments on their own (Puustinen & Rouet, 2009).

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