Students' self-control and learning outcome in a university blended course

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Abstract: Self-control has been regarded as a critical factor which influences people's success in their lives, including their academic achievement. This paper reports a study which aimed to investigate the impact of self-control on a group of 94 university students' learning in a blended course. Data about their learning experiences were collected via pre-test, post-test and weekly reports during their studies. Their capability of self-control was measured by a self-control trait scale. It was found that the self-control could predict the students' learning outcomes. Path analyses revealed that the effect was mediated through course participation.

Keywords: Self-control, course participation, learning outcome, blended learning

Introduction

By combining the strengths from both traditional and online learning, blended learning has become increasingly popular in higher education in Australia. Learning in this environment, the students need to take good control on their study by maintaining the motivation and effort and resisting the factors distracting their study. Self-control can be regarded as one's capability to modify or adapt oneself in order to remain a better and more optimal fit between self and world [1]. Self-control enables people to make plans and carry them out in the face of difficulties and challenges [2]. Therefore, self-control refers to a personality trait, needed to achieve long term goals through being able to control one's impulses and to resist threat to those goals [3].

Self-control is assumed to be associated with the students' learning outcomes. In Tangney's [4] research, students used study strategies more effectively had better learning outcomes. Mischel [5] found the participant in their research with lower level of self-control had troubled psychological portrait in their lives. Moreover, the impact of self-control could influence people's every aspect of their lives, such as educational qualification, health, wealth, and criminal offending [6]. Although the causal relationship between self-control and learning achievement is widely accepted, further research should be done in this area, especially in a blended learning environment. In a web-based learning environment, having good self-control could help students maintain their focus and effort on learning and keep their course engagement in order to achieve their learning goals. More research is needed to study how self-control can predict the students' learning outcome, e.g., mediated through their course participation or engagement. Moreover, it is worthwhile to investigate further, in a blended course, what aspects of the course engagement (e.g., online interaction, the amount of time spent online and offline) will contribute to the students' learning achievement.

Methodology

The present paper reports a research project which examined the learning of 94 university students who took a blended course which combined traditional lectures and workshops with online interactions and online access to course materials. 94 students completed the online pre and post-test questionnaires at the beginning and the end of the semester respectively. During the semester, the students were asked to complete online brief study reports for 6 weeks, which mainly asked about the hours study spent for the course, perceived difficulty level, stress, and workload. 74 out of the 94 students participated in the weekly report survey. This paper presents the effect of self-control on the students' learning outcome.

The students' personality traits of self-control and learning outcome were measured in the pre-test and post-test respectively. The measurement on self-control used in the present study was the Self-control Scale by Tangney et al. [4], which was a questionnaire with 13 items from the long form of 36 items. For each item, students would answer a self-referring statement based on a five-point scale from "Not like me at all" to "Very much like me". The post-test also measured the students' learning outcomes, was indexed by the aggregate percentage score recorded for assignments completed and marked within the course.

Their course participation was reflected by the data from the students' posts in the course online forum each week and weekly reports tapped the students' course experience over 6 weeks. The records form the students' online discussion were coded in the database in terms of number of contributions, latency, and contribution length.

Results

Among the 94 participants, 52% were above the mid-point (39) of the items of self-control, which included students' capability of deferring gratification, resisting temptation, managing efforts, and achieving long-term goals. The students' overall learning outcome was the final marks they received within the course, which was the aggregate of the results from assignments and online forum contribution based on each assessment's weighting. The full score was 100. By the end of semester, 93 students out of 94 had passed the course, among whom 23% achieved Distinction and High Distinction (75-100), 46% received Credit (65-74), and 20% obtained Pass (50-64), and 1 student (1%) failed (below 49).

In the weekly reports, there were different factors such as the number of hours they spent online (online hours) and offline (offline hours) for the course, difficult level, work load, and stress level. The number of the weekly reports the students finished was counted as the report frequency. Finally, the students rated the course experience as positive and negative, and the instances of both positive and negative ratings were counted as the course rating. The available figures were averaged across the 6 weeks for obtain a weekly average figure for each participant. Several factors in the online forum were accounted in the students' course participation, which are elaborated as the followings: *online contribution frequency --- the number of the posts they sent to the online discussion forum; online contribution length --- the sum of the words of the students' posts.*

From the results of correlations, it shows that the students' learning outcome is correlated with their capability of self-control, online contribution frequency, online contribution length, report frequency and difficult level at a significant level (table 7).

Table 7 *Correlations between learning outcome, self-control, and the factors during learning process*

	1	2	3	4	5	6	7	8	9
1. Learning outcome	–	.25*	.51**	.52**	.25*	.26*	.27*	.14	.22*
2. Self-control		–	.23*	.19	.05	.17	.14	-.19	-.01
3. Online contribution frequency			–	.61**	.25*	25*	.34**	.25*	.07
4. Online contribution length				–	.32**	.23*	.35**	.29*	.06
5. Report frequency					–	.16	.90**	.66**	.09
6. Online hours						–	.21	.14	.28*
7. Positive ratings							–	.59**	.14
8. Negative ratings								–	.18
9. Difficult level									–

Note. (a) $n = 74$, (b) *. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

The concept of the students' course participation was initially constructed on the key variable - online contribution frequency, which was also correlated with online contribution length, report frequency, online hours, positive ratings, and negative ratings. All these variables were added in the construct of SmartPLS model [7, 8] one by one progressively to ensure that the validity of the construct for each stage could be maintained. Based on the result of the construct validity, four variables (online contribution frequency, online contribution length, report frequency, and online hours) contributed to the construct of course participation (AVE = .48, Cronbachs Alpha = .63). Therefore, course participation was indexed by four independent factors: (a) online contribution frequency, (b) online contribution length, (c) report frequency, and (d) online hours. Table 8 illustrated the distribution of the students' course participation. It is found that the students' learning outcome was related with self-control and course participation at a significant level (Table 9).

Table 8 *Frequency of weekly reports*

	Mean	*Median*	*SD*	*Skewness*	*Kurtosis*	*Minimum*	*Maximum*
Course participation	8.82	8.63	2.73	.78	1.08	4	18

Note. (a) $n = 74$

Table 9 Correlation between self-control, course participation, and learning outcome

	1	2	3
1.Learning outcome	–	.25*	.58**
2.Self-control		–	.23*
3.Course participation			–

Note. (a) $n = 74$, (b) *. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Relationships between self-control and learning outcome were investigated using the partial least squares approach (PLS) for path modeling. The initial model tested is shown in Figure 4. This figure depicts the expected relationships between self-control, course participation, and outcome, as based upon initial expectations.

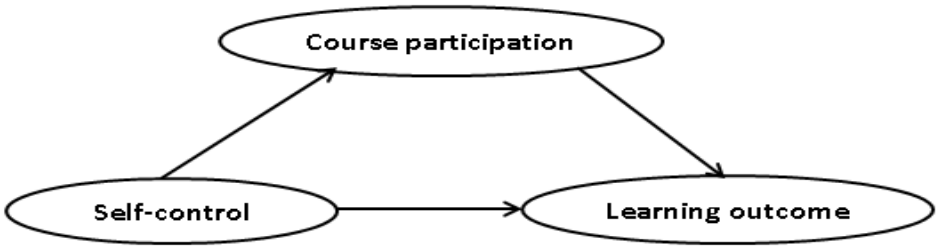

Figure 4 Initial model of the impact of self-control on students' learning outcome

Figure 5 presents the final depiction of the significant pathways of the relationship between self-control, course participation, and outcome. Non-significant pathways were trimmed to produce a parsimonious and descriptive model. 34% of the variance in learning outcome was predicted by the variables (self-control and course participation) (R^2 of .34). In the final path modeling, self-control has a direct influence on course participation. However, the effect is mediated through course participation. The direct and indirect effects of self-control on the students' learning outcome account respectively 46% and 54% of the relationship (Table 10).

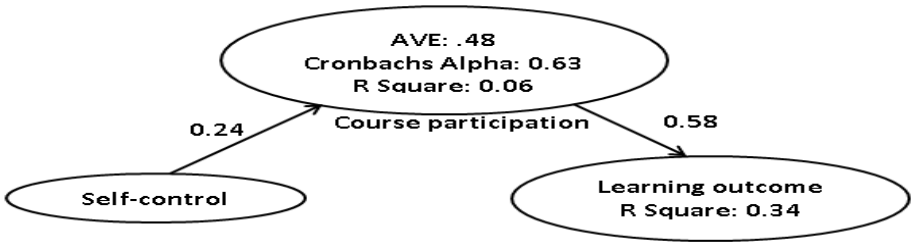

Figure 5 Final model of the relationship between self-control, course participation and outcome

Table 10 Mediation analysis: impact of self-control on learning outcome

Bivariate correlation	.246
Total effect accounted for in the PLS model	.246
Direct effect (self-control to learning outcome)	.114 (46%)
Mediated through course participation	.132 (54%)

Note: The percentage figures refer to percentage of the variance accounted for with regard to direct and indirect effects. The indirect effects account for 54% of the relationship.

Discussion and conclusion

It was noted that the students' scores on a personality scale of overall disposition to exercise self-control, which was measured at the beginning of the study period, could significantly predict their learning outcome by the end of the course. The finding in the present study adds to the construct validity of the scale published by Tangney [4]. It is also important to point out that the prediction of self-control on the students' learning outcome was mediated through their course participation, the hours spent for the course online, active participation in online forum and the project, which could represent the effort and hard work the students put for the course.

As there are different variables tapping the students' learning process and the main factors were correlated with each other (Table 7), construct development is necessary to form a single resolution. After testing the construct validity through PLS model, a single

factor resolution has been approved, which also improve the consistency of the students' behavior in the course regarding different aspect of learning process. This implied that the students with active course participation would be motivated to put effort to various learning tasks in terms of the time they spent for the course, participation in online discussion and the research itself. This highlighted the importance of online engagement, in terms of the time spent online for researching, browsing, practicing and the motivation to participation in online forum. Therefore, in a blended learning environment, the students' online engagement can be regarded as a critical factor for their success.

Finally, in addition to the influence of self-control on the students' achievement in traditional classroom [9], the findings of the research emphasized the importance of the positional self-control in an online learning environment, which was also reinforced by Tsai [10]. In Tsai's study, three domains of e-learning strategies are identified in the mode --- perceived-skill, affection and self-regulation domains. It would be worthwhile to have further investigation on the factors of the students' learning process, such as participation in online forum, the motivational strategies and cognitive strategies they applied, the impact of online interaction between the students and teachers on their learning, as the certain parts of the learning process through using online learning components in a blended course remained unknown in the present research.

The limitations of the presentation study concerned the data regarding the weekly report. The brief questionnaire was conducted weekly, but was returned in only about half the cases. The data of students' participation in their learning in terms of online hours were averaged across weeks for the purpose of analysis, which could make it available that a meaningful unit could be derived from each individual participant. However, the extent to which this constituted an accurate index of the amount of time the students spent overall remained unknown.

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