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Research Paper

Longitudinal Investigation into Predicting Student Certification Examination Success

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Abstract: *Educational policy makers are constantly looking for ways to improve students' quality. It is important issue that encouraging students to increase their pass rate of licensure exams. The purpose of this research was to determine which of the predictors (test anxiety, self-efficacy, and self-regulated learning) has the greatest ability to account for the certification examination success. The present study used a semester teaching course for three-wave longitudinal design an included 159 freshmen in financial related programs from three classes from a university in Taiwan. The results revealed that the influence efficiency of foresting factors of certification examination success for the participants were self-regulated learning, self-efficacy. But, the test anxiety doesn't be a predictor. Additionally, there is no significant difference for the different gender and different background high school students for their certification examination success. This article concludes that effectively teaching students the skills to 'learn how to learn' and enhancing students' self-efficacy in certification assessments. Lastly, induce with a discussion of the limitations and future research for professional certification examination success.*
Keywords: ***Examination success, Self-efficacy, Self-regulated learning, Student certification, Test anxiety***

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I. INTRODUCTION

Professional accreditation by occupational licensures has become a necessity for university students as a basic requirement for employment (Goetz*et al*., 2011; Hsunand Tzu, 2008). A student's certification is a form of occupational licensing, and licensure exams are one of the most common screening tools used in the certification of competitive students, aimed at making sure that students have the requisite skills to be effective in the workplace (Shuls, 2018). The rapid expansion of career and technical education programs in Western society has some people questioning the efficacy of these programs in preparing professionals for the workforce (Duncan*et al*., 2013). Previous studies have focused on certification examinations, such as those offered for intensive care nursing (Santiano andDaffurm, 2003), certified financial planning (Cutler*et al*., 2005), radiation oncology (Kun *et al*., 2005), teacher certification (Blackford*et al*., 2012; Clotfelter *et al*., 2010; Goldhaber, 2007; Shuls, 2018), and family medicine (Noel*et al*., 2017).

The Technological and Vocational Education Program (TVEP) has become an important focus for Taiwan policymakers who are interested in smoothing transitions for young people from school to the workplace by attempting to increase students' competitiveness and address the labor shortage (Ministry of Education, 2019). In a similar manner, achieving professional certification has emerged as a trend in many countries (Cheng*et al*., 2012). Business college students want to be highly competitive in their future careers; thus, professional certification has emerged as a means of identifying recent graduates worthy of recruitment or promotion. Students can attain the desired certification as part of their program of study or graduation requirements. Responding to this trend, most vocational schools have actively encouraged students to obtain professional certifications while they are students (Cheng, 2014). From vocational university websites in Taiwan, we found that about 81% of schools provide incentives for students to apply for a license exam, and give bonuses to students who obtain licenses. Additionally, attaining the relevant certifications is a prerequisite for all technology universities. These certifications must be officially recognized by governing bodies such as the Ministry of Labor, Academy of Banking and Finance, Ministry of Examination R.O.C., and Tourism Bureau

R.O.C, and the appropriate professional certificate depends on the student's area of study (Cheng and Chiou, 2010).

Accounting is an important basic course for business school students, and accountant certification is granted by the Ministry of Labor of Taiwan. Although obtaining professional certification is important for university students, the pass rate of the accountant certification examination is only 62% in Taiwan (Taiwan Workforce Development Agency, 2019). There have been previous studies on predictors of certification examination success; however, most of these studies focused on academic predictors. The study by Silvestri et al. (2013) is one of the few studies on non-academic predictors of certification examination success in the United States. Social cognitive theory, introduced as social learning theory in the 1960s by Albert Bandura, proposes reciprocal determinism, i.e., the reciprocal interactions of an individual with a set of learned experiences, his/her environment (external social context), and behavior (responses to stimuli to achieve goals)(Mahmood*et al*., 2014). Several studies have noted cultural differences among non-academic factors. For example, Oettingen and Zosuls (2006) investigated how adolescents' self-efficacy beliefs differ between Asian and Western countries. Moreover, Chen (2006) indicated that some college students feel that career planning does not provide a clear path for achieving their goals, thus leading to self-handicapping behavior with respect to obtaining the information necessary to move forward. It is important to identify the significant predictors underlying certification examination success. Prior research has reported test anxiety in Arabic cultures compared with those of the United States or European countries. Educational and cultural differences may also contribute to differences in self-regulated learning (SRL) behaviors of Western and Asian students (Purdie and Hattie, 1996).

In the present research, we conducted a short-term longitudinal study of university accounting students to identify significant predictors underlying accountant certification examination success among non-academic predictors (test anxiety, self-efficacy, and SRL).

II.LITERATURE REVIEW

Test anxiety and exam performance

Learning anxiety has been identified in many different curricula (e.g., computers, science, statistics, mathematics, and foreign language). Recently, there were some studies focuses the anxiety issue.For example, Ameen *et al*. (2002) studied teaching anxiety among accounting professors in the United States and determined that the vast majority of respondents (78%) had experienced teaching anxiety. Buckhaults and Fisher (2011) identified accounting anxiety in educators and students as a possible explanation for the decline in accounting education; their study emphasized the need for new accounting teaching methods to reduce stress for both the teacher and students.In general, there is a negative relationship between test anxiety and task performance (Nie*et al*., 2011). Moreover, Chen *et al*. (2013) identified a significant relationship between learning attitude and anxiety among Taiwanese hospitality management students in accounting classes. But there also studies in which test anxiety was not negatively related to performance (Hembree, 1988). So it is more precise discussion whether there was positive or negative relationship between test anxiety and performance in Certification Examination Success.The present research proposed the following hypothesis:

H1: Test anxiety will be negatively related to accounting to accounting certification exam performance.

Self-efficacy and exam performance

Since the introduction of Bandura's Social Learning Theory, the construct of the self-efficacy has been widely studied in psychology in an attempt to understand and predict human behavior (Gore, 2006; Pajares,2003). There are numerous studies that demonstrate self-efficacy's importance for students' success in a general academic and practice setting (Bong andSkaalvik, 2003; Im and Kang, 2019; Pajares, 2003). Consistent with the general definition of self-efficacy, academic self-efficacy refers to students' perceptions of their competence to do their class work (Midgley*et al.*, 2000). Empirically, academic self-efficacy has been consistently found to be positively associated with academic achievement in learning context (Adesola and Li, 2018; Bonaccio and Reeve, 2010). Together previous literatures the academic efficacy is positively predictor of academic achievement.Thus, the present research proposed the following hypothesis:

H2: Self-efficacy will be positively related to accounting certification exam performance.

Self-regulated learning and exam performance

Past research indicates a reduction in test anxiety when students adopt various strategies, such as SRL (Lee*et al*., 2012). Numerous studies have been conducted on the relationships between learning, motivation, achievement, and self-regulation (Pintrich, 2004; Rheinberg *et al*., 2000). SRL is learning that is goal-oriented, of

a conscious mindset, and controlled by the student as opposed to a tutor or teacher (Rheinberg*et al*., 2000). Examples include students attempting to gain familiarity with a mathematical formula, studying for a pilot's license, or learning how to work with a computer. Thus, learning motivation plays a key role in the SRL process (Rheinberg*et al.*, 2000). Research has shown that across a broad range of subjects, SRL methods can be effective in promoting students' learning skills and, thereby, furthering academic achievement (Ahmad*et al.*, 2012; Dignath andButtner 2008; Dignath*et al*., 2008). In Taiwan, several studies have also indicated a lack of review and preparation as potential reasons for low performances on tests [e.g., accounting (Chen*et al*., 2013; Cheng and Liao, 2016). Thus, SRL plays a crucial role in the process of promoting students' academic achievement. As such, the present research proposes the following hypothesis:

H3: Self-regulated learning is positively related to accounting certification exam performance.

III. METHOD

For longitudinal study, Singer and Willett (2003) suggest three important features of a study of changeincludes: 1) three or more waves of data; 2) an outcome whose value change systematically over time; 3) a sensible metric for clocking time. The present study used a three-wave longitudinal design an included 165 freshmen in financial related programs from three classes from a university. All participants in this study were requirement for course credit and they informed to attend this study before freshmen orientation as well as given complete examination of accounting certification. The participants came from three classes. Each intact class was taught by a single instructor during a semester course. At a half-day workshop, three instructors those received training on the Accounting Practice Achievement Test. Excluding six respondents incomplete and the final sample was composed 159 participants (91 females, 57%), age (M = 18.02 years, SD = 0.79), high middle school majoring in business (n = 80, 56%).

The measures used in the current research were based on existing measures that have demonstrated reliability and validity in the existing literature. The items included in the survey were compiled in English and then translated into Mandarin by translation/back-translation (Brislin, 1976). The items were rated using a seven-point scale, with 1 corresponding to "total disagreement" and 7 corresponding to "total agreement." Some items were reworded slightly for adaptation to the present setting.

Test anxiety (TA)

TA was measured using an approach adapted from Pintrich and De Groot (1990), with four items. Sample items included the following: "I am so nervous during a test that I cannot remember facts that I have learned" and "When I take a test, I think about how poorly I am doing." The Cronbach's *alpha*of T0, T1, T2 were 0.70 ~ 0.81.The test-retest reliability between T0 and T1 was 0.67.

Accounting Self-efficacy (ASE)

ASE was measured using the seven-point scale described above, adapted from Cheng and Chiou (2010), with eight items included in the measurement. The sample items included the following: "Compared with other students in this class, I expect to do well" and "I'm certain that I can understand the ideas taught in this accounting course."The Cronbach's *alpha* of T0, T1, T2 were 0.69 ~ 0.83. The test-retest reliability between T0 and T1 was 0.72.

Self-regulated learning (SRL)

The SRL behavior questionnaire, adopted from Kurman (2006), included six items, including the following sample items: "I did all of my homework" and "I was very attentive in class." Cronbach's *alpha* was 0.82. The Cronbach's *alpha* of T1, T2 was 0.72, and 0.84. The test-retest reliability between T1 and T2 was 0.76.

Exam performance level (EPL)

The Accounting Exam Performance (ACH; Bureau of Employment and Vocational Training, 2012) is a standardized test based on a study by Cheng and Chiou (2010). To create the exam, questions were selected from field test banks via random sampling. The criteria for grading the papers were based on the standards set by the Bureau of Employment and Vocational Training, Executive Yuan, with scores ranging from 0 to 100. The exam took approximately 110 min to complete. The Accounting Exam Performance assessment of participants was given two times (T0 and T1) during one semester, at the beginning of the semester (T0; M = 38.90, SD = 22.98), this exam performance is regarded as an initial exam performance of participants, two months later this exam performance is regarded first phase exam performance of participants (T1; M = 63.28, SD = 26.35), at the end T2 (after four months), the exam performance was transited into two level: < 60 (fair, EPL = 0) and >= 60(success, EPL =1), 0 indicated that student fair obtain accounting exam certification (n = 46), and 1 indicated that student success obtain accounting exam certification (n = 113).

Procedure

The current study was approved by the institutional review board of Tainan University of Technology. In the orientation (T0), participants were given a short briefing about their participation. After participants signed consent forms, they are asked to complete of accounting self-efficacy, test anxiety, and then the Accounting Practice Exam performance. Two months later (T1), they are asked to complete of self-regulated learning, accounting self-efficacy, test anxiety, and then the Accounting Practice Exam performance. Four months later (T2), they are asked to complete of self-regulated learning, accounting self-efficacy, test anxiety, and attendthe Accounting certification examination be held by Taiwan Workforce Development Agency.

Official certification examination organized by skill

In order to ensure standardized instruction across participants, instructors adopted identical teaching materials and followed a clearly defined curriculum (Cheng and Chiou, 2010). Students' evaluations of teaching used a 6-point scale with anchors 1: Totally disagree and 6: Totally agree for 20 items and subscales of attitude (4 items, Cronbach's alpha = .72), instruction (8 items, Cronbach's alpha = .85), and content (8 items, Cronbach's alpha = .91). No significant differences among classes were detected on the mean rating of teaching evaluations after the semester (Class 1, M = 4.9, SD = 1.2; Class 2, M = 5.0, SD = 1.1; Class 3, M = 4.8, SD = 0.9; F (2, 156) = 2.61, p > .05). Differences in instructors did not contribute to differences in scores on the accounting exam performance. Aggregate data cross the three classes are appropriate for subsequent analysis.

IV.RESULTS

Three analyses were performed. First, the descriptive statistics for the predictor variables by success/fail status are displayed. Second, the correlation among all the predictors was conducted. Third, this study investigated the research question using logistic regression.

Descriptive comparisons for the predictor variables

We investigated the descriptive comparisons for the predictor variables between the professional certification examination success and fail group students use independent t-test and chi-square test.As displayed in Table 1, the results reveal there are not significantly difference for the gender group and senior middle school majoring in businessstatus group. Additionally, we find the test anxiety of students also not significantly difference. Moreover, students' accounting achievement and their accounting self-efficacy, and self-regulated learning all have significantly difference. This means that the students of success group have more achievement, accounting self-efficacy, and self-regulated learning behavior than the students of fail group. But their test anxiety of success group differed from the students of fail group.

Table 1. Descriptive Statistics for Predictor Variables

Variables	Success (n = 113) M (SD)	Fail (n = 46) M (SD)	Over all (n = 159) M (SD)	$\chi^2(1)$ or t (157)	p value
Female [a]	70	22	92	2.65	.103
Male [a]	43	24	67		
Senior Middle School(Business) [a]	68	21	89	2.61	.105
Senior Middle School (Nonbusiness)[a]	45	25	70		
Accounting achievement [b],T0	47.14(20.56)	18.67(14.56)	38.90(22.98)	10.23	.000
Accounting achievement [b], T1	74.52(16.12)	35.68(26.27)	63.28(26.35)	10.67	.000
Accounting self-efficacy[c], T0	5.02(0.94)	4.64(0.93)	4.91(0.95)	2.52	.013
Accounting self-efficacy [c], T1	5.09(0.91)	4.69(1.09)	4.97(0.98)	2.43	.016
Accounting self-efficacy[c], T2	5.16(0.71)	4.74(0.93)	5.04(0.80)	2.85	.005
Test anxiety[c], T0	4.45(1.09)	4.78(1.31)	4.55(1.17)	-1.68	.094
Test anxiety[c], T1	4.95(0.89)	4.71(0.95)	4.88(0.91)	1.59	.114
Test anxiety[c], T2	4.42(0.75)	4.63(1.05)	4.48(0.85)	-1.41	.160
Self-regulated learning[c], T1	5.27(0.53)	4.52(0.88)	5.05(0.73)	6.02	.000
Self -regulated learning[c], T2	5.39(0.64)	4.23(1.08)	5.06(0.95)	8.19	.000

[a] Frequency

[b] Score range from 0 to 100

[c]Participants' evaluation for7-point scale

We further exam the trends of accounting self-efficacy and test anxiety among the three phases. For participant whose accounting self-efficacy reveal the linear trend was significant, of success group, F (1, 336) = 6.25, p< .001. This finding indicated the positive consecutive effect elicited in accounting self-efficacy; the magnitude of enhancement smoothly as well as linearly.On the other hand, the students' accounting self-efficacy doesn't reveal linear trend in the fail group. Moreover, the linear trend doesn't exist on test anxiety for the success and fail group.

Correlations among all the predictors for the success and fail group

The Bivariate correlations of research variables for success and fail group are presented in Table 2. The results reveal the following phenomenon. First, there exist the negative relationship between achievement and test anxiety for the success group, but there exist at not all negative relationship between achievement and test anxiety for the fail group. Second, there exist the positive relationship between accounting self-efficacy and achievement for the success and fail group and the correlation coefficient of the success group greater fail group. Third, there exist the negative relationship between accounting self-efficacy and test anxiety for the success group, but there exist at not all negative relationship between accounting self-efficacy and test anxiety for the fail group. Fourth, there exist the positive relationship between accounting test anxiety and self-regulated learning for the success and fail group and the correlation coefficient of the success group greater fail group. Finally, there exist the positive relationship between accounting self-efficacy and self-regulated learning for the success and fail group and the correlation coefficient of the success group greater fail group.

Table 2.
Pearson correlations of all variables

	1	2	3	4	5	6	7	8	9
Success group (n = 113)									
1-Achievement, T0									
2-Achievement, T1	.54								
3-Accounting self-efficacy, T0	.27	.18							
4-Accounting self-efficacy, T1	.26	.25	.69						
5-Accounting self-efficacy, T2	.30	.32	.59	.76					
6-Test anxiety, T0	-.29	-.14	-.06	-.04	-.08				
7-Test anxiety, T1	-.01	-.11	-.42	.66	-.51	.24			
8-Test anxiety, T2	-.10	-.22	-.37	.34	-.34	.27	.31		
9-Self-regulated learning, T1	.10	.11	.29	.25	.27	.30	.22	.25	
10-Self-regulated learning, T2	.11	.17	.35	.36	.35	.13	.21	.22	.49
Fail group (n = 46)									
1-Achievement, T0									
2-Achievement, T1	.43								
3-Accounting self-efficacy, T0	.21	.15							
4-Accounting self-efficacy, T1	.11	.19	.84						
5-Accounting self-efficacy, T2	.16	.16	.48	.57					
6-Test anxiety, T0	.07	.07	.24	.29	.36				
7-Test anxiety, T1	.15	.12	.51	.61	.81	.20			
8-Test anxiety, T2	-.05	.04	.12	.25	.45	.10	.25		
9-Self-regulated learning, T1	-.06	-.02	.23	.25	.24	.16	.15	.18	
10-Self-regulated learning, T2	-.02	.06	.28	.28	.32	.21	.14	.19	.33

All correlation at least significant .05 level

Logistic regressions

The third set of analyses tested the predictors for National professional certification examination success for business university students. Prior to analyses, not include the control variables; we centered all T0, T1, T2 predictors to reduce collinearity as this transformation does not have any effect on the value of the logistic coefficients and their estimated standard errors (Jaccard, 2001). Therefore, to ensure that multicollinearity did not distort the results of the analyses, the predictor terms were based on deviation scores (i.e., scores that deviated from their mean) (cf. Aiken and West,1991).

This study used alogistic regression model on three models. Three modes variables were entered into the analysis in the following order: (1) control variables, initial accounting achievements, initial test anxiety, and initial accounting self-efficacy (Model 1); (2) Add to the first phrase accounting achievements, first phrase test anxiety, first phrase accounting self-efficacy, and first phrase self-regulated learning behaviors (Model 2) and, (3) Add to again second phrase test anxiety, second phrase accounting self-efficacy, and second self-regulated learning behaviors (Model 3). As shown in Table 3.First, the Hosmer-Lemeshow tests of the three models are 12.804 (ns), 7.810(ns) and 12.067(ns). Thus, all the three models fit well, and the NagelkerekeR^2 of the three models is .378, .628, and .876. Second, the findings indicated that three variables: gender, senior middle school majoring in business status, and test anxiety were not significantly predictors. Third, the results reveal that achievement, accounting self-efficacy, and self-regulated learning all was significantly predictors in three models. Fourth, compare the *Odds ratio* of effect predictors in three models, the findings indicated that *Odds Ratio*of achievement ranged from 2.232 to 3.539, which are median effect, *Odds Ratio* of accounting self-efficacy ranged from 1.599 to 2.231, which are also median effects, the *Odds Ratio* of self-regulated learning ranged from 3.685 to 4.920, which are large effects (cf. Sanchez,-Meca*et al.*, 2003). The findings indicated that "how learn to learn" play a key role in students learning process. Finally, compare the three models whether has significantly difference, the results of the χ^2 difference test (Model1, $\chi^2 = 51.953$, d.f. = 4; Model 2, $\chi^2 = 100.988$, d.f. = 9, $\Delta\chi^2 = 49.395$, d.f.

= 5, p < .01) thus, the Model 2 is significantly superior to Model 1. Moreover, the results of the χ^2 difference test (Model 2, χ^2 = 100.988, d.f. = 9; Model 3, χ^2 = 166.668, d.f. = 12, $\Delta\chi^2$ = 65.68, d.f. = 3, p < .01) thus, the Model 3 is also significantly superior toModel 2.In sum, model 1, model 2, and model 3 have significant different explanations to investigate the predictors for professional certification examination success for business university students in the longitudinal design and Model 3 has greatest predict power. In sum, the hypothesis H1 was not supported and H2, H3 were supported.

Table 3.
Logistic regressions predicting National professional certification examination success for business university students

	Model 1			Model 2			Model 3		
	b	SE	Odds ratio	b	SE	Odds ratio	b	SE	Odds ratio
Predictors, T0									
Gender	-0.083	0.431	0.920	-1.165	0.606	3.205	-0.824	0.983	2.28
SMS-Business(YN)	-0.518	0.482	0.596	-0.128	0.600	0.046	-1.319	1.134	0.267
ACH_0	1.221	0.273	3.392**	0.803	0.362	2.232*	1.115	0.594	3.050*
ASE_0	0.688	0.229	1.308**	0.687	0.394	1.987*	0.802	0.844	2.231*
TA_0	-0.038	0.209	1.038	-0.152	0.277	1.164	-0.552	0.430	0.576
Predictors, T1									
ACH_1				1.264	0.336	3.539**	1.192	0.561	3.294*
ASE_1				0.696	0.418	1.599*	0.327	0.909	1.721*
TA_1				-0.488	0.354	0.815	-0.485	0.761	1.624
SRL_1				1.506	0.338	4.509**	0.379	0.627	3.685**
Predictors, T2									
ASE_2							1.028	0.976	1.658*
TA_2							-0.183	0.431	1.200
SRL_2							3.674	0.870	4.920**
Model fit test	χ^2(df = 4) = 51.953** Hosmer-Lemeshow test = 12.804 (n.s.)			χ^2(df = 9) = 100.988** Hosmer-Lemeshow test = 7.810(n.s.)			χ^2(df = 12) = 166.668** Hosmer-Lemeshow test = 12.067(n.s.)		
Percent correctly classified	74.5%			86.6%			95.5%		

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

V. DISCUSSION

The major findings of this study are discussed below. First, our results showed that the non-academic variables, accounting self-efficacy and SRL, have greater predictive power than academic variables associated with initial and past accounting achievement. These results are analogous to those of Silvestri *et al.*(2013) who identified self-efficacy as a significant predictor of success among nursing students taking the National Council Licensure Examination. Second, a linear trend analysis was conducted to examine the influence of students' accounting self-efficacy in the success group; the results revealed a linear trend in achievement for the first (T0) and second (T1) time periods. The third time period (T2) showed higher accounting self-efficacy than the T0 and T1 periods (F(1, 110) = 170.55, p < .001 for T0; F(1, 110) = 142.21. p < .001 for T1). Students developed their accounting knowledge over time; thus, their accounting self-efficacy indicated a positive consecutive effect as they became more comfortable with the material. This finding is in line with the results of previous studies that emphasized past experience as a precursor of self-efficacy (Bandura 1997; Thatcher and Perrewe, 2002; Tschannen-Moran and Hoy, 2007). The findings are also consistent with those of Chiou and Wan (2007); they found that the self-efficacy of study participants in searching for information on the internet increased with positive task experiences. Third, the odds ratio of SRL showed a greater effect in logistic regression analyses. The results of the present study confirmed that accounting lectures improved student achievement through SRL strategies. These results echoed the findings of Hofer and Yu (2003) who described interventions to facilitate students'ability to "learn how to learn" (a powerful mental tool to help students master tough subjects) as an important factor in undergraduate-level coursework. Learning how to proceed is key in SRL (Oates, 2019) and the impact of learning how to learn increases self-efficacy and reduces test anxiety (Hofer and Yu, 2003). Fourth, previous studies have found higher efficacy to be related to greater use of SRL strategies and higher achievement (Zimmerman and Martinez-Pons, 1990). The current research indicated higher achievement, higher efficacy, and high SRL in the group who were successful. The reasons for this may be that the students in the success group were more proactive than reactive in their approaches to learning from Western educators (Samuelowicz, 1987). Finally, test anxiety did not play a significant role in the longitudinal design and was consistent with the findings of Abdi *et al.*(2012). In Table 2, test anxiety had little impact on T0 and T1 accounting achievement in the success group, but had a major impact on T0 and T1 accounting achievement in the fail group. These results are similar to those of previous studies indicating that students respond differently, depending on their level of stress and coping strategies (i.e., study and test-taking strategies) (Onwuegbuzie, 1998). For example, some students in the fail

group of participants adopted escape-avoidance strategies when faced with stress (Forman, 1993). Hence, some scholars have pointed out the importance of teachers mitigating student's stress response by recognizing this behavior and teaching emotional adjustment strategies (Mao*et al*., 2003).

Implications

There are several implications to be drawn for certification examinations from the findings of the present study. Past research focused on the social or educational aspects of certification examination success using only cross-sectional data and logistic regression analysis methods (Kim *et al*., 2005; Nguyen*et al*., 2010; Vardhan and Biju, 2013). However, tracking students' development over time is an important issue in educational achievement, because students' achievement, learning, and their psychological status (e.g., test anxiety and self-efficacy) change over the course of the learning process. Thus, longitudinal data analysis is necessary to resolve the dynamic roles of these factors. The present study examined students' achievement, test anxiety, and accounting self-efficacy over three time phases as they related to students' professional certification examination success, as opposed to previous studies that placed more emphasis on predictors of students' academic achievement (Curtis, 2011; Malgwi, 2004; Onyeizugbo, 2010).

There are also several educational implications to be drawn from the findings of this research. For policy makers, administration departments currently propose incentives to motivate students to pursue professional certification. The results from this study revealed that the integration of academic and nonacademic variables were better predictors of students' professional certification examination success, with self-efficacy and self-regulation being the most important for university accounting students. As such, we suggest that the policy makers provide teacher workshops to encourage teachers to improve coursework design and teaching performance. It is essential that teachers understand the dynamics of student learning as it relates to educational achievement testing. For example, problem-based teaching methods with a longitudinal teaching approach and strategies to enhance student's self-efficacy (overall and academic) would be helpful. Our results also showed that accounting students' self-efficacy and self-regulation were key predictors for professional certification examination success. In sum, achievement, accounting self-efficacy, and self-regulated learning were at least medium effects for the odd ratio of success group compared fair group in all three models. Self-efficacy and self-regulated learning can be emphasized in the students' learning process, effectively teaching the students to 'learn how to learn' for professional certification examination success.

The results also indicated that the senior middle school background of students was not a significant predictor of professional certification examination success for business university students. Students with the right learning approach and with the ability to cultivate a higher level of accounting self-efficacy should be successful in their certification testing as they become more proficient in the subject area.

Limitations and future research

This study had several limitations. First, self-regulated learning behavior was assessed by self-reports only, although the measures were validated against external criteria (Lee*et al.*, 2012). Nevertheless, in future research, an external evaluation of learning behaviors (*e.g.*, by teachers) is expected to strengthen the research findings. Second, further limitations of the study were related to the course selection. That is, in this study, we restricted our subject to accounting certification. Because students of different departments have different needs for professional certification, different levels of test anxiety and self-efficacy are expected. Therefore, future studies should expand on the present research findings towards other professional certification examinations. Third, data were acquired over a four-month period in this study; future research should consider longer periods (e.g., a year) to track students' learning processes more fully and the associated predictors. Forth, previous studies indicated that goals affect performance through different mechanisms (Locke and Latham, 2002). The existing research adopted the integration of professional practice examinations with the personal financial planning curriculum improve students; professional success (Goetz*et al*., 2011). The further research may integrate the goal theory to the current research, to investigate the pass rate of certification examinations. Finally, the current study focused only on Taiwanese university students; there may be cultural differences in the study variables among students from different countries (El-Zahharand Hocevar, 1991). For example, Turinganand Yang (2009) investigated a cross-cultural comparison of self-regulated learning skills between Korean and Filipino college students. Bodas and Ollendick (2005) examined test anxiety from a cross-cultural perspective. OettingenandZosuls (2006) investigated adolescent self-efficacy from different countries. Thus, a cross-cultural research design that allows for direct comparison between cultures would provide more meaningful conclusions.

VI. CONCLUSION

The results from this study indicate that students' gender and the senior middle school (SMS) background of students were not significant predictors of professional accountant certification examination success for business university students. Students with good study strategies were able to pass the examination. In this study, we focused on examination performance as it related to students' test anxiety, accounting

self-efficacy, and SRL behavior for national professional certification examination success. The pass rate for accountant certification is currently about 62% among business students in Taiwan. However, the students' pass rate was 71% in the teaching design of the present study, with an increase in the approval rate of the accounting certification examination of about 9%. As opposed to using incentives alone to motivate students, the results from this study support adopting teaching curriculum designs that address students' test anxiety and coping mechanisms, effectively teaching students the skills to 'learn how to learn' and enhancing students' self-efficacy in certification assessments. Thus, in keeping with social cognitive theory, the importance of context in student learning is highlighted in the results from this study.

REFERENCE

[1]. Abdi, H.M., Bageri, S., Shoghi, S., Goodarzi, S.H. andHosseinzaden, A. (2012), "The role of metacognitive and self-efficacy beliefs in students' test anxiety and academic achievement",Australian Journal of Basic and Applied Sciences, Vol6 No.2, pp.418-422.

[2]. Adesola, S.A. andLi, Y. (2018),"The relationship between self-regulation, self-efficacy, test anxiety and motivation", International Journal of Information and Education Technology,Vol.8 No.10, pp.759-763.

[3]. Ahmad, S., Hussain, A. andAzeem, M. (2012), "Relationship of academic SE to self-regulated learning, SI, test anxiety and academic achievement", International Journal of Education,Vol.4 No.1, pp.2-25.

[4]. Aiken, L.S and West, S.G. (1991), Multiple regression: Testing and interpreting interactions, SAGE, Newbury Park, CA.

[5]. Ameen, E.C., Guffey, D.M. and Jackson, C. (2002), "Evidence of teaching anxiety among accounting educators",Journal of Education for Business, Vol.78, pp.16-22.

[6]. Bandura, A. (1997), Self-efficacy: The excise of control.Freeman, New York, NU.

[7]. Blackford, K., Olmstead, G. andStegman, C. (2012), "Teacher licensure and qualified teachers: Are certification examinations enough?"American Journal of Educational Studies,Vol.50, pp.5-19.

[8]. Bodas, J. and Ollendick, T.H. (2005), "Test anxiety: A cross-cultural perspective", Clinical Child and Family Psychology Review,Vol.8, pp.65-88.

[9]. Bonaccio, S. and Reeve, C. L. (2010), "The natures are relative importance of students' perceptions of the sources of test anxiety",Learning and Individual Differences, Vol.20 No.6, pp.617-625.

[10]. Bong, M. and Skaalvik, E. (2003), "Academic motivation in self-efficacy: How different are they really?"Educational Psychological Review,Vol.15, pp.1-40.

[11]. Brislin, R.W. (1976),"Comparative research methodology: Cross cultural studies", International Journal of Psychology, Vol.11 No.3, 2pp.15-229.

[12]. Buckhaults, J, & Fisher, D. (2011), "Trends in accounting education: decreasing accounting anxiety and promoting new methods", Journal of Education for Business, Vol.86, pp.31-50.

[13]. Chen, P.H. (2006), "Motivational problems and regulation strategies in the self-regulated learning of technological and vocational college students", Bulletin of Educational Psychology, Vol.38 No.1, pp.37-50 (in Chinese).

[14]. Chen, B.H., Hsu, M.S. and Chen, M.H. (2013), "The relationship between learning attitude and anxiety in accounting classes,the case of hospitality management university students in Taiwan", Quality and Quantity, Vol.47, pp.2815-2827.

[15]. Cheng, P.Y. (2014), "Roles of commitment and foreseeability in understanding student attitude changes toward the certification examination in Taiwan",Career and Technical Education Research,Vol.39 No.3, pp.231-242.

[16]. Cheng, P.Y. and Chiou, W.B. (2010), "Achievement, attributions, self-efficacy, and goal setting by accounting undergraduates", Psychological Reports, Vol.106 No.1, pp.54-64.

[17]. Cheng, P.Y., Hsu, P.K. and Chiou, W.B. (2012), "Undergraduates' intentions to take examinations for professional certification: Examinations of four competing models", Asia Pacific Education Review, Vol.12 No.4, pp.691-700.

[18]. Cheng, P.Y. and Liao, W.R. (2016),"The Relationship between test anxiety and achievement in accounting students with different cognitive styles: The mediating roles of self-regulation", International Research Education, Vol.4 No.2, pp.14-33.

[19]. Chiou, W.B. and Wan, C.S. (2007), "The dynamic change of self-efficacy in information searching on the Internet: Influence of valence and prior self-efficacy", The Journal of Psychology, Vol.141 No.6, pp.589-603.

[20]. Clotfelter, C.T., Ladd, H.F. andVigdor, J.L. (2010), "Teacher credentials and student achievement in high school: A cross-subject analysis with student fixed effects", Journal of Human Resources,Vol.45, 655-681.

[21]. Curtis, S.M. (2011), "Formative assessment in accounting education and some initial evidence on its use for instructional sequencing", Journal of Accounting Education,Vol.29, pp.191-211.

[22]. Cutler, R., Grange, V., Hampton, V., Langdon, T. and Ryan, M.(2005), "Analysis of factors relating to success on the CFP certification", Financial Services Review, Vol.14,pp.55-72.

[23]. Dignath, C. andButtner, G. (2008), "Components of fostering self-regulated learning among students: A meta-analysis on intervention studies at primary and secondary school level",Metacognition and Learning,Vol.3, pp.231-264.

[24]. Dignath, C., Buttner, G. and Langfeldt, H.P. (2008), "How can primary school students learn self-regulated learning strategies most effectively? A meta-analysis on self-regulation training programs", Educational Research Review, Vol.3, pp.101-129.

[25]. Duncan, D.W. Cannon, J. and Kitchel, A. (2013),"Teaching efficacy: A comparison of traditionally and alternatively certified CTE teachers in Idaho", Career and Technical Education Research, Vol.38 No.1, pp.57-67.

[26]. El-Zahhar, N.E. andHocevar, D. (1991), "Cultural and sexual differences in test anxiety, trait anxiety and reusability", Journal of Cross-Cultural Psychology,Vol.22, pp.238-249.

[27]. Forman, S.G. (1993), Coping skills interventions for children and adolescents. Jossey-Bass Inc, San Francisco, CA.

[28]. Goetz, J.W., Zhu, D., Hampton, V.L., Chatterjee, S. and Salter, J. (2011), "Integration of professional certification examinations with the financial planning curriculum: Increasing efficiency, motivation, and professional success", American Journal of Business Education,Vol.4 No.3, pp.35-46.

[29]. Goldhaber, D. (2007), "Everyone's doing it, but what does teacher testing tells us about teacher effectiveness?"Journal of Human Resources,Vol.42, pp.765-794.

[30]. Gore, P. (2006), "Academic self-efficacy as a predictor of college outcomes: Two incremental validity studies", Journal of Career Assessment, Vol.14, pp.92-115.

[31]. Hembree, R. (1988), "Correlates, causes, effects, and treatment of test anxiety", Review of Educational Research, Vol.58, pp.47-77.

[32]. Hofer, B.K. and Yu, S.L. (2003), "Teaching self-regulated learning through a learning to learn course", Methods and Techniques,Vol.30 No.1, pp.30-33.

[33]. Hsun, S.K. and Tzu, L.Y. (2008), "A research on the competency of financial professions", Business Review,Vol.13, pp.47-70.

[34]. Im, T. and Kang, M. (2019), "Structured relationship of factors on learner achievement in online learning environment", International Review of Research in Open and Distributed Learning, Vol.20 No.1, pp.1-15.
[35]. Jaccard, J. (2001), Interaction effects in logistic regression. SAGE, Thousand Oaks, CA.
[36]. Kim, T.H., Lee, S.M., Yu, K., Lee, S. and Puig, A. (2005), "Hope and the meaning of life as influences on Korean adolescents' resilience: Implications for counselors", Asia Pacific Educational Review, Vol.6 No.2, pp.143-152.
[37]. Kleiner, M.M. (2000),"Occupational licensing", The Journal of Economic Perspectives,Vol.14, pp.189-202.
[38]. Kun, L.E., Ang, K., Erickson, B., Harris, J., Hoppe, R., Leibel, S. and Hattery, R. (2005), Maintenance of certification for radiation oncology, International Journal of Radiation Oncology Biology Physics,Vol.62, pp.303-308.
[39]. Kurman, J. (2006), Self-enhancement, self-regulation, and self-improvement following failure, British Journal of Social Psychology, Vol.45 No.2, pp.339-356.
[40]. Lee, J., Yu, H. and Choi, S. (2012), "The influences of parental acceptance and parental control on school adjustment and academic achievement for Southern Korean Children: The mediation role of self-regulation", Asia Pacific Education Review,Vol.13 No.2, pp.227-237.
[41]. Locke, E. A. andLatham, G. P. (2002), "Building a practically useful theory of goal setting and task motivation: A 35-tear odyssey", American Psychologist,Vol.57 No.9, pp.705-711.
[42]. Mahmoodi, M.H., Kalantari, B. and Ghaslani, R. (2014), "Self-regulated learning (SRL), motivation and language achievement of Iranian learners", Procedia Social and Behavioral Sciences,Vol.98,pp.1062-1068.
[43]. Malgwi, C.A. (2004), "Determinants of accounting anxiety in business students", Journal of College Teaching and Learning, Vol.1 No.2, pp.81-94.
[44]. Mao, W.C., Bardewll, W.A., Major, J.M. andDimsdale, J.E. (2003),"Coping strategies. Hostility, and depressive symptoms: A path model", International Journal of Behavioral Medicine,Vol.10, pp.331-342.
[45]. Midgley, C., Maehr, M.L., Hruda, L.Z., Anderman, E., Anderman, L. and Freeman. K.E. (2000), Manual for the patterns of adaptive learning scales. Ann Arbor, University of Michigan, MI.
[46]. Ministry of Education (2019).Retrieved May 24, 2019, fromhttps://english.moe.gov.tw/cp-32-14631-7DF9C-1.html
[47]. Nguyen, A., Hays, B. andWetsein, M. (2010), "Showing incoming students the campus ropes: Predicting student persistence using a logistic regression model", Journal of Applied Research in the Community College, Vol.18 No.1, pp.16-21.
[48]. Nie, Y., Lau, S. and Liau, A.K. (2011),"Role of academic self-efficacy in moderating the relationship between task importance and test anxiety", Learning and Individual Differences,Vol.21,pp.736-741.
[49]. Noel, K., Archibald, D. and Brailovsky, C. (2017), "Practice simulated office orals as a predictor of certification examination performance in family medicine", Can Fan Physician,Vol.63,pp.299-305.
[50]. Oates, S. (2019),"The importance of autonomous, self-regulated learning in primary initial teacher training", Curriculum Instruction, and Pedagogy,Vol.4,pp.1-8.
[51]. Oettingen, G. and Zosuls, K.M. (2006), "Culture and self-efficacy in adolescents", In Pajares, F., &Urdan, T.(Ed.), Self-efficacy beliefs of adolescents, Information Age Publishing, Greenwich, CT, pp.245-265.
[52]. Onwuegbuzie, A.J. (1998), "The role of hope in predicting statistics anxiety", Psychological Reports,Vol.82, 1315-1320.
[53]. Onyeizugbo, E.U. (2010), "Self-efficacy and test anxiety as correlates of academic performance", Educational Research, Vol.1 No.10,pp.477-480.
[54]. Pajares, F. (2003), "Self-efficacy beliefs, motivation and achievement in writing: A review of the literature", Reading and Writing Quarterly, Vol. 19, pp.135-158.
[55]. Pintrich, P.R. (2004), "A conceptual framework for assessing motivation and self-regulated learning in college students", Educational Psychology Review, Vol.16 No.4, pp.385-407.
[56]. Pintrich, P.R. and De Groot, E.V. (1990), "Motivational and self-regulated learning components of classroom academic performance", Journal of Educational Psychology, Vol.82, pp.33-40.
[57]. Purdie, N. and Hattie, J. (1996), "Cultural differences in the use of strategies for self-regulated learning", American Educational Research Journal,Vol.33, pp.845-871.
[58]. Rheinberg, F., Vollmeyer, R. and Rollett, W. (2000), Motivation and action in self-regulated learning. InBoekaerts, M., Printrich, P.R., &Zeidner, M. (Ed.), Handbook of self-regulation: Theory, research, and application,Academic Press, San Diego, CA.pp.503-529.
[59]. Samuelowicz, K. (1987). Learning problems of oversea students: Two sides of a story.Higher Education Research and Development,6, 121-134.
[60]. Sanchez-Meca, J., Marin-Maartinze, F. andChacon-Moscoso, S. (2003), "Effect-size indices for dichotomized outcomes in meta-analysis", Psychological Methods,Vol.8 No.4, pp.448-467.
[61]. Santiano, N. and Daffurn, K. (2003),"Registered nurses' self-perceived level of competence following completion of a specialist graduate certificate", Australian Critical Care, Vol.16, pp.16-23.
[62]. Shuls, J.V. (2018), "Raising the bar on teacher quality: Assessing the impact of increasing licensure exam cut-scores", Educational Policy,Vol.32 No.7, pp.969-992.
[63]. Silvestri, L.A., Clark, M.C. and Moonie, S.A. (2013), "Using logistic regression to investigate self-efficacy and the predictors for national council licensure examination success for baccalaureate nursing students", Journal of Nursing Education and Practice,Vol.3 No.6, pp.21-34.
[64]. Singer, J.D., &Willett, J.B. (2003).Applied longitudinal data analysis, Oxford University Press, New York, NY.
[65]. Taiwan Workforce Development Agency (2019). Retrieved May 27, 2019, from http://www.mol.gov.tw/cht/index.php
[66]. Thatcher, J.B. and Perrewe, P.L. (2002),"An empirical examination of individual traits as antecedents to computer anxiety and computer self-efficacy", MIS Quarterly,Vol.26 No.4, pp.381-396.
[67]. Tschannen-Moran, M. and Hoy, A.W. (2007).The differential antecedents of self-efficacy beliefs of novice and experienced teachers.Teaching and Teacher Education,Vol.23 No.6, pp.944-956.
[68]. Turingan, J. and Yang, Y.C. (2009),"A cross-cultural comparison of self-regulated learning skills between Korean and Filipino college students", Asian Social Science, Vol.5, pp.3-10.
[69]. Vardhan, J. andBiju, S. (2013), "A binary logistic regression model for entrepreneurial motivation among university students- A USE perspective", Journal of Educational and Social Research,Vol.2 No.3, pp.75-86.
[70]. Zimmerman, B.J. and Martinez-Pons, M. (1990), "Student differences in self-regulated learning: Relating grade, sex, and giftedness to self-efficacy and strategy use", Journal of Educational Psychology,Vol.82, pp.51-59.