

The validation of measures of self-efficacy, motivation and self-regulated learning among Thai tertiary students

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Introduction

Learning is about a great deal more than acquiring knowledge and developing skills. If learners do not also develop the capability of directing their own learning and acting on the world around them, they will be only partially educated, and limited in what they can do (Hammond & Collins, 1991). Moreover, learning is facilitated when the process is initiated and owned by the learner (Taylor, 1999). The learners have to become more independent, responsible and effective for their own learning (Codde, 1996; Long, 2001). Zeegers, Martin & Martin (1999) note that a principal goal of higher education is to foster individuals who are capable independent learners. This is a goal in higher education of many countries including Australia and Thailand.

The aim of tertiary study in Australia is to develop learners who are independent, confident and self-directed (Briguglio, 2000). Many universities in this place that increased importance in self-directed learning are turning to flexible learning to support individual learning (McNaught, 2000). Moreover, learning environments in Australia emphasise critical thinking and self-direction (Gordon, 2001). The development of learner self-direction not only has been a focus in Australia but also in Thailand.

In historical periods of Thai education, the development of the individual learners was one of Thai education objectives (Miller, 1968). However, the development of the individual learners has been more concerned in the period of education reform (Office of the National Education Commission, 1999). Therefore, the aim of Thai tertiary study is currently encouraging learners to become independent learners. The Eighth Higher Education Development Plan (1997-2001) of Thailand covers many aspects including teaching and learning processes. The teaching and learning processes in higher education need to encourage learners to be more flexible and independent by using innovative technology as teaching and learning media (Tiranasar, 1999). The Thai National Education Act identifies strategies that shall enable learners to learn by themselves (Povatong, 1999).

In summary, tertiary education in both Australia and Thailand currently encourages learners to take responsibility for their own learning. Self-directedness is then central to higher education in both Australia and Thailand.

Psychological dimension: One of dimensions of self-direction in learning

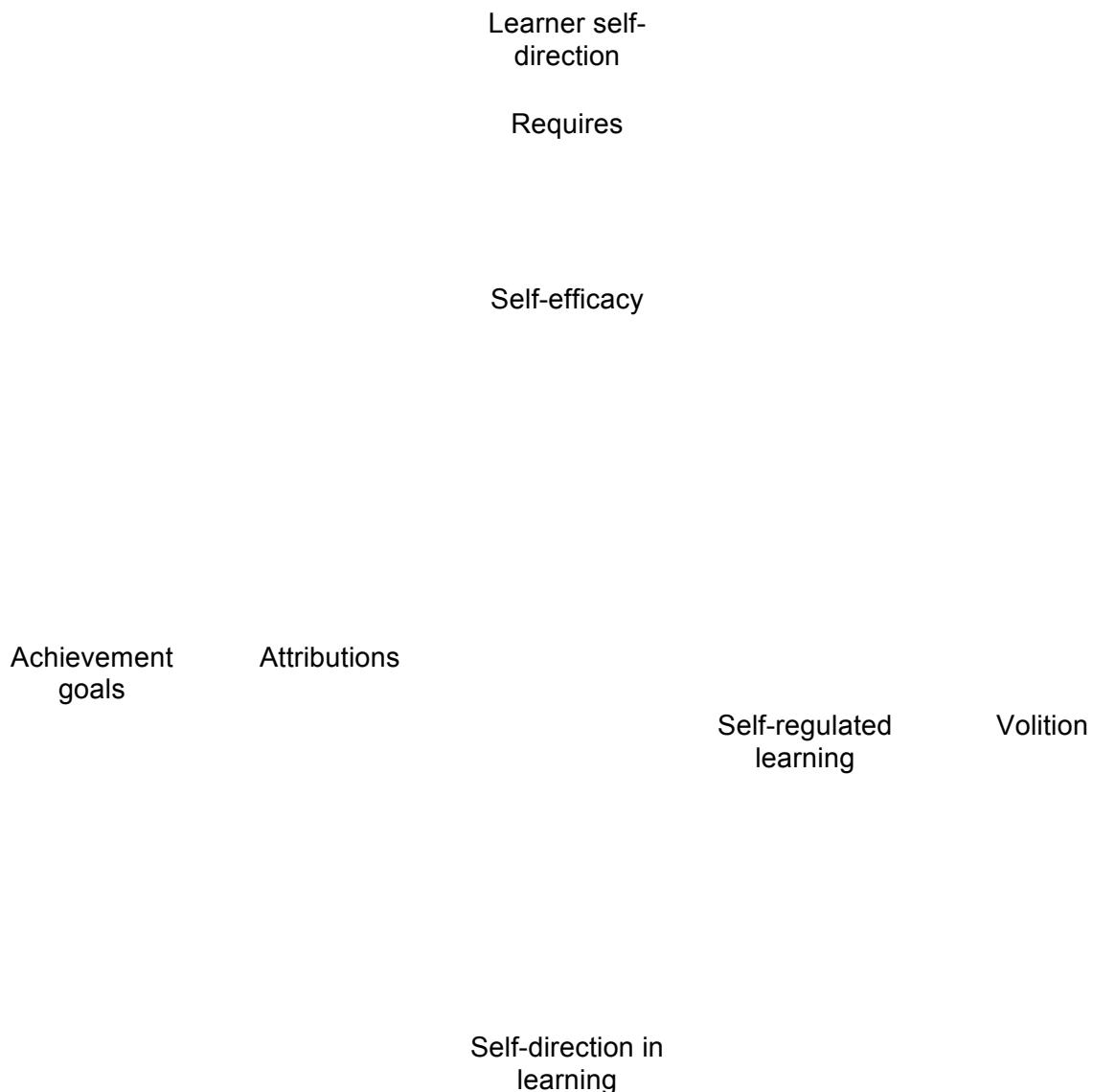
Brockett & Hiemstra (1991) note that self-direction in learning refers to two distinct related dimensions. Firstly, it is a process in which a learner assumes primary responsibility for

planning, implementing and evaluating the learning process (instructional process). Secondly, it is referred to as learner self-direction, centres on a learner's desire or preference for assuming responsibility of learning (internal characteristics of the learner). Additionally, Long (2001) notes that self-direction in learning has three dimensions. They consist of sociological, a pedagogical and a psychological dimension.

The psychological dimension has been addressed as a learner's mental state. The dimension is the degree to which the learner or the self that maintains active control of the learning process (Long, 2001). The dimension is necessary and sufficient to explain self-direction in learning (Ponton & Carr, 2000). Therefore, self-direction in learning is an internal process that ultimately must be chosen and acted upon by the individual (Bulik & Romero, 2001; Candy 1991; Hiemstra, 1994; Long, 2001; Ponton & Carr, 2000). An individual's ability to maximize self-direction in learning can be enhanced (Brockett & Hiemstra, 1991). Hoban and Sersland investigated the relationship between self-direction in learning of adult university students and Bandura's construct of self-efficacy. Students who demonstrate a high degree of self-efficacy also demonstrate a high degree of self-direction in learning (Hoban, Seraland & Raine, 2001).

Self-efficacy has been defined as individuals' beliefs about their performance capabilities in a particular domain. Self-efficacy focuses on individuals' beliefs about their performance capabilities in a particular domain (Alderman, 1999; Maltby, 1995; Woolfolk, 2001). Self-efficacy beliefs influence on the choices individuals make and the courses of action they pursue (Pajares, 1996). Moreover, the research reports an individual's sense of self-efficacy is also related to achievement goals (Bråten & Olaussen, 1998; Pajares, Britner & Valiante, 2000), attributions (Chase, 2001; Sherman, 2002) self-regulation (Joo, Bong & Choi, 2000; Malpass, O'Neil & Hocevar, 1999) and volition (Garcia, McCann, Turner & Roska, 1998). These variables describe the degree to which individuals are active participants in their own learning.

In conclusion, the previous paragraph outlined the sufficiency of learner's mental state of self-direction in learning. While, self-efficacy is related to self-direction in learning, it is also related to achievement goals, attributions, self-regulation and volition. Therefore, the variables can be identified as a part of attribution of learner self-direction.

Figure 1 Individual differences and self-direction in learning

Culture plays an important role in the development of the individual's orientation to learning (Smith, 1990). Cultural influences can impact on many educationally relevant variables such as motivation, orientation toward learning, ways of thinking, and unconscious beliefs and values (The American Psychological Association, 2001; Claxton, 1999; Matsumoto, 1994; Munro; Schumaker & Carr 1997). Dembo & Eaton (1997) note that cultural factors reflect and shape an individual's mental functioning as well as their beliefs and behaviours.

Some research has explored the relationship between culture and an individual's sense of self-efficacy (Earley, Gibson & Chen, 1999; Oettingen, 1995) achievement goals (Stipek, 1998) attributions (Alderman, 1999; Fan & Karnilowicz, 1999; Kurman, 2001). Culture also has been examined in its relationship to the individual's learning behaviours such as self-regulation (Chye, Walker & Smith 1997; Kurman, 2001).

In conclusion, cultural factors, then, impact on the way in which individuals define and interpret "self-directedness". That is, what it means to be self-directed in learning may reflect

specific cultural settings through the impact of culture on self-efficacy, achievement goals, attributions, self-regulation and volitional behaviour.

Recently, research has addressed the relationship between self-direction in learning and the psychological factors including motivation and self-efficacy (Hoban, et al., 2001; Holzer, 2002; McCall, 2002; McCoy, 2001). However, no research to date examining self-directedness from the perspective of individual differences (see Figure 1) among tertiary students in Thailand. Moreover, no existing research has focused on the potential cultural and disciplinary differences of the individual different variables of self-direction in learning of Australian and Thai students.

Therefore, this research is designed to examine the potential cultural and disciplinary differences in self-directed learning among tertiary students. Specifically, the research compares student self-efficacy, achievement goals, attributions and reported self-regulatory and volitional behaviour from a cultural perspective (Australia and Thailand) and from a disciplinary perspective (nursing and psychology). The findings of the study will contribute significantly both to the general field of self-directed learning and more specifically to the field of cross-cultural understandings of student learning as well as specific application to a Thai setting.

When instruments are used for respondents with a different cultural background, it is necessary to establish the cross-cultural validity of these instruments (Van Hemert, Baerveldt & Vermande, 2001). This research is based on instrumentation, self-efficacy (Greenglass, Schwarzer & Taubert, 1999), achievement goals and attributions (Chan, 1994; Midgley, et al., 1998), and self-regulatory and volitional behaviour (Cantwell & Moore, 1996; McCann & Garcia, 1999), developed in western cultures. The first stage of the project, the validation of the instruments for use among Thai tertiary students, is reported on this paper.

Biases: Cross-cultural research

Vijver & Leung (1997) note that studies in which data from various cultural groups are compared can be plagued by biases such as construct bias, method bias, and item bias. Construct bias includes poor sampling of relevant behaviours (e.g., short instruments, overlap in behaviours). Method bias includes lack of comparability of samples (e.g., differences in educational background, age, or gender composition). Item bias includes inadequate items including poor item translations. In relation to the item bias, the cross-cultural translation was conducted.

Translating questionnaire items using cross-cultural translation technique

Item bias can be produced by sources such as incidental differences in appropriateness of the item content, inadequate item formulation and inadequate translation (Vijver & Leung 1997). There are three options that are available for instrument translations in multilingual studies: application, adaptation, and assembly. Application is where a literal translation is taken to be linguistically and psychologically appropriate. The adaptation option is used in different cultural contexts. Adaptation is used when researchers believe that only a few items are expected to show cultural differences. The assembly option is used when the original instrument is assumed to be inadequate in a new context and a new instrument is developed to capture the construct more adequately in the new cultural context.

The main objectives of the research are to examine potential cultural (Australia and Thailand) and disciplinary (nursing and psychology) differences in self-directed learning among tertiary students. The adaptation option is selected to use for questionnaire translations in this research. There are some identified reasons for using this option. The

Thai education system has been influenced from western ideas since 1868 in many ways such as the cooperation with international organisations (Office of the National Education Commission, 1999). The cooperation influences on Thai education system including learning and teaching process. It may be assumed that there are some cultural differences between western and Thai in term of learning. Therefore, the adaptation was selected to use in this research.

However, Banville, et al., (2000) explain that transferring a research instrument from one culture to another is a delicate endeavour. The instrument must be not only reliable and valid but also meaningful in the other culture. The quality of the instrument will enhance cross-cultural comparisons. They discuss translating questionnaires and inventories using a cross-cultural translation technique. Their study followed Vallrand's (1989) seven-step methodology for translation and validation of an instrument. Vallrand's methodology allows researchers to highlight a weakness in the instrument. The methodology fits the adaptation option. The methodology is shown in the following steps.

1. Preparation of preliminary versions (using the back translation technique)
2. Evaluation of preliminary versions and preparation of an experimental version (using the committee approach)
3. Pre-test the experimental version (using a random survey)
4. Evaluation of the concurrent and content validity (using bilingual participants)
5. Evaluation of the Reliability (looking into internal consistency and time stability)
6. Evaluation of the construct validity (looking into the structure of the instrument factorial analysis and inter-scale correlation and studying the construct effect test hypothesis coming from theory)
7. Establishing norms (selecting the population and statistical indices) (Banville, et al., 2000)

Questionnaire translation - Present study

To examine item equivalence in the present study, five (steps 1, 2, 4, 5 and 6) of the seven steps methodology were employed. Initial translation was carried out by bilingual translators and refined by a bilingual committee. Content validity was assessed using a bilingual group of Thai students. Construct validity was then assessed using a group of Thai university students. The five steps are outlined below.

Part 1: Initial translation

Part 1 follows steps 1 and 2 of the cross-cultural translation technique model. The main objective of these steps is to confirm the accuracy of translation by the bilingual translators and the bilingual committee. Five separate questionnaires containing 134 items in all were used. The questionnaires measuring self-efficacy, achievement goals, attributions, self-regulation and volitional strategy were sent to two Thai bilingual translators for translation from English language into Thai. The five separate questionnaires are detailed below:

1. Reactions to Daily Events Questionnaire: proactive and reflective subscales, 25 items (Greenglass, et al., 1999)
2. Goal Orientation Questionnaire, 18 items (Midgley et al., 1998)
3. Causal Attribution Questionnaire, 40 items (Chan, 1994, adapted by Cholowski, 1998)
4. Strategic Flexibility Questionnaire, 21 items (Cantwell & Moore, 1996)
5. Academic Volitional Strategy Inventory, 30 items (McCann & Garcia, 1999).

Two Thai bilingual translators, a teacher from Thailand's Department of Non-Formal Education and an educator from the Ministry of Education, fluent in English and Thai, independently translated the questionnaires from the English language into Thai. They then met to compare their translations. Among 134 items, only 9 were translated exactly the same way. 106 items were similar in meaning, although different words were used and 19 items were found to have different meaning. The 19 items had been adjusted before the Thai version had been sent to other translators.

Table 1: differences found in Thai translation

	Items
1	I like challenges and beating the odds. (Proactive Coping Qno. 4)
2	When I apply for a position, I imagine myself filling it (Proactive Coping Qno. 10)
3	I turn obstacles into positive experiences. (Proactive Coping Qno. 11)
4	In my mind I go through many different scenarios in order to prepare myself for different outcomes. (Reflective Coping Qno. 17)
5	Before tackling a difficult task I imagine success scenarios. (Reflective Coping Qno. 20)
6	When there are serious misunderstandings with co-students, family members or friends, I practice before I will deal with them. (Reflective Coping Qno. 24)
7	I like studying best when it really makes me think. (Task goal orientation Qno. 1)
8	I like to study material that I'll learn from, even if I make a lot of mistakes. (Task goal orientation Qno. 5)
9	I would feel successful at university if I did better than most of the other students. (Ability-approach goal orientation Qno. 18)
10	Once I have found a satisfying way of approaching my study, I feel it is safest to stick with this method. (Inflexible Qno. 11)
11	Although I usually understand the information I should include in my assignments, I often have difficulty deciding where and when I should use that information. (Irresolute 16)
12	While I usually feel confident about my purpose in completing an assignment, I often lose direction when dealing with detailed information, and find myself uncertain of how to deal with this. (Irresolute Qno. 17)
13	I often look forward to discovering new or different ways of completing problems or assignments I have been given. (Adaptive Qno. 18)

14	I think about my other coursework, and that if I don't get going or continue this study session I'll fall behind in the assignments for the rest of my courses. (Self-efficacy enhancement Qno. 10)
15	I think about the amount of time my classmates probably study for this class, and that they will get a better grade than me. (Negative-based incentives Qno. 18)
16	I think about the sacrifices that I have made, or that my parents are making to put me through university. (Negative-based incentives Qno. 20)
17	I tell myself that I will have enough time to talk to my professor, teacher's assistant, or classmates for help if needed, if I just get down (or back) to my studying. (Self-efficacy enhancement Qno. 21)
18	I think about my strengths and the resources that I can draw upon to help me with difficult assignments or test information. (Self-efficacy enhancement Qno. 27)
19	I think of about things that make me feel good whenever I am feeling frustrated about what I need to get for this class. (Self-efficacy enhancement Qno. 28)

Two other Thai bilingual translators fluent in English and Thai independently translated the Thai version of the questionnaires into English. They were a teacher from The Foreign Languages Department of Sai Num Peung High School in Thailand and a postgraduate student from the Faculty of Business at Queensland University of Technology in Australia. They compared their translations. They reported that the 134 items were similar in meaning although some different words are used. Therefore, the simple worded version was selected for the bilingual committee.

The bilingual committee consisted of the Dean of the Faculty of Liberal Arts of Saint Louis College, Thailand, the Associate Professor of the Faculty of Humanity at Srinakharinwirot University, Thailand, and the Ph D student undertaking this research. In this process, the original English version, the English version produced from the Thai version and Thai version were compared. They determined that of the 134 items, 97 items had the same meaning, 25 items were closely matched, while 12 items were not a good match. The bilingual committee changed 12 items in Thai version. The reasons for these changes were addressed in three main reasons.

1. The items appeared differently in the original English version and the English version produced from the Thai version.
2. The items in Thai version were changed to suit the sentence order of the Thai language.
3. The items of the Thai version were changed to suit the Thai learning context.

Table 2 : Items poorly matching

	Items	Number of Reasons and Changing Objectives
1	Despite numerous setbacks, I usually succeed in getting what I want. (Proactive	(2) This item has been swapped. The positive sentence comes first.

	Coping Qno. 6)	
2	I take action only after thinking carefully about a problem. (Reflective Coping Qno. 21)	(2) This item has been changed, by concerning the order of behaviours.
3	I would feel really <u>good</u> if I were the only one who could answer the questions in class. (Ability-approach goal orientation Qno. 2)	(3) "that I have got ability" was used to show the meaning of the modest instead of "good".
4	I'd like to show my lecturers that <u>I'm smarter</u> than the other students in my classes. (Ability-approach goal orientation Qno. 4)	(3) "that I have got more ability" was used to show the meaning of the modest instead of "I'm smarter"
5	It's important to me that the other students in my classes think that I am good at my <u>work</u> . (Ability-approach goal orientation Qno. 10)	(3) "study" was used instead of "work" to make the learning situation clearer.
6	An important reason why I do my <u>work</u> is because I like to learn new things. (Task goal orientation Qno. 11)	(3) "study" was used instead of "work" to make the learning situation clearer.
7	An important reason I do my <u>work</u> is because I enjoy it. (Task goal orientation Qno. 14)	3. "study" was used instead of "work" to make the learning situation clearer.
8	One reason I would not participate in class is to avoid looking stupid. (Ability-avoid goal orientation Qno. 15)	(1) This sentence has been adjusted.
9	An important reason why I do my <u>work</u> is because I want to get better at it. (Task goal orientation Qno. 16)	(3) "study" was used instead of "work" to make the learning situation clearer.
10	The reason I do my <u>work</u> is so others won't think I'm dumb. (Ability-avoid goal orientation Qno. 17)	(3) "study" was used instead of "work" to make the learning situation clearer.
11	Suppose you handed in your assignment and your lecturer <u>said</u> it was not good enough. It was most likely because (Causal Attributions Qno.7)	(3) "complain" was used instead of "said" to show the meaning of the students' feelings when the lecturers talk about their weak points.
12	I find I am easily distracted from my line of thought as I am working, and this often makes my work disjointed and uneven.	(1) This sentence has been adjusted.

	(Irresolute Qno. 21)	
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After these amendments, the original English version and Thai version were used in the next stage of the study.

Part 2: Content validity

Part 2 follows step 4 of the cross-cultural translation technique model. The main objective of this step is to validate the questionnaires within the Thai culture.

Participants

A group of thirty Thai bilingual university students was selected for this study. The group was comprised bilingual students who were studying the English Program as the major of their B.A. Degrees in the second semester of 2001 at Srinakharinwirot University, Thailand.

Materials

The English and Thai versions of the five questionnaires have been used in this study.

Procedures

The bilingual university students were invited to complete English version of the questionnaires. Three weeks later, then, they were invited to complete the Thai version of the same set of questionnaires. Consistency of items between the English and Thai versions was assessed using paired t-tests (as a measure of substantive difference) and zero-order correlation (as a measure of strength differences) and zero-order correlation (as a measure of strength and direction of concordance).

Analyses

Paired t-tests were used to compare the two means (Sprinthall, Schmutte & Sirois, 1991). If the English and Thai versions were equivalent, then one would expect only small differences in students' responses to the English and Thai versions (Banville, et al., 2000). Thus, the paired t-test indicated the comparisons of the English and Thai version means for each of the items. This procedure checks that the magnitude of responses is not significantly different between the English and Thai versions.

Pearson correlation is a measure of the relationship between two variables (Wiersma, 2000). The Pearson correlation was used to measure the strength direction of the relationship between responses to the English and Thai versions of each item. If the English and Thai versions are measuring the same psychological constructs, then the resulting correlation between items should produce significant positive correlations (Banville, et al., 2000).

Results

The paired t-tests indicated that for 129 items responses to the English and Thai versions were not statistically significant, while 5 items were statistically different ($p < .05$). However, while significant the differences were substantively small.

Table 3: Paired T-Tests: Mean Different Items between the English and Thai Versions

Items	Mean		Sig
	English	Thai	
1. I think about every possible outcome to a problem before tackling it. (Reflective coping Qno. 25)	2.75	2.96	.02
2. Suppose your class was given a very difficult worksheet to do and you got most of the answers right. This was likely because (D) You tried very hard to work out the answers. (Personal control over learning Qno. 1D)	3.38	3.54	.04
3. Although the assignment I am working on may require me to use several different ways of working, I usually end up sticking to my normal methods. (Inflexible Qno.5)	2.96	3.21	.03
4. Although I often know the general ideas relating to a topic, I often get caught out when asked for details, and I'm never sure how to overcome this. (Irresolute Qno. 20)	3.13	2.96	.04
5. I think about my strengths and the resources that I can draw upon to help me with difficult assignments or test information. (Self-efficacy enhancement Qno. 27)	3.29	3.46	.04

The correlations between items on the English and Thai versions indicated that 132 items were significantly positively correlated. Analyses indicated 2 items were non-significant correlations. In both cases, the correlation remained positive and substantial.

Table 4 : Pearson Correlation: non-significant correlation items Between the English and Thai Versions

Items	Correlation	Sig
1. When I have a problem, I usually see myself in a no-win situation. (Proactive coping Qno. 14)	.38	.07
2. I exercise for about a half-hour before I begin studying to clear my head and help me get relaxed. (Stress reducing actions Qno.12)	.29	.17

To conclude this section, 7 items were found to different translation, using paired t-tests and Pearson correlations. The results suggested that it was reasonably safely ignores these differences. Thus, the 7 items were still retained in the questionnaires for conducting Steps 5 and 6.

Part 3: Construct validity

Part 3 covers steps 5 and 6 of the cross-cultural translation technique model. The main objective of these steps is to verify the construct validity of the translated questionnaires.

Participants

A convenience sample of one hundred and fifty Thai-speaking students was selected. The group comprised Thai college students who were studying in the Nursing Program in the second semester of 2001 at Saint Louis College Thailand. Students were selected from third and fourth years.

Materials

The Thai version of the questionnaires included the items that had been found to be less reliable in translation (discussed in the previous section). They were included because the problems with translation were relatively small. The option to remove can be removed from future analysis demanded.

Procedures

The Thai-speaking students were invited to complete the Thai version of the questionnaires. The construct validity was assessed using two statistical procedures:

1. Step 5 the reliability analysis was used.
2. Step 6 the single factor principal component analysis was used.

Subjects for these analyses were 146 Thai university students who responded to Thai version only. These included 122 third and fourth year student from Saint Louis College, and the data from the 24 bilingual students from step 4 (discussed in the part 2).

Analyses

Reliability refers to consistency of the instrument in measuring whatever it measures (Wiersma, 2000). Hair, Anderson, Tatham & Black (1998) note that any scale should be analysed for reliability to ensure its appropriateness before proceeding to an assessment of its validity. In this part, reliability was used to check the consistency of the Thai version of the questionnaires.

In addition to reliability, factor analysis had been used in analyses. The factor analysis is particularly useful in the validation of scales for the measurement of specific constructs is used. The aim factor analysis used is to see they are similar to those emerge when the questionnaires were used in previous studied (Hair, et al., 1998).

This research contains the components from five separate questionnaires. The set of five questionnaires has been defined 14 independent subscales. The Reactions to Daily Events Questionnaire consists of separate proactive and reflective subscale. The Goal Orientation Questionnaire consists of task goal orientation, ability-approach goal orientation and ability-avoid goal orientation subscales. The Causal Attribution Questionnaire consists of personal control over learning, self-blame for failure and learned helplessness subscales. The Strategic Flexibility Questionnaire consists of adaptive, inflexible and irresolute subscales. The Academic Volitional Strategy Inventory consists of stress reducing actions, self-efficacy enhancement and negative-based incentives subscales.

Therefore, the single factor principal component analysis was used to confirm the structure of 14 individual subscales of the questionnaires. The marked loading of .30 was used to measure the indicated loading because there is nothing to factor analyse as no correlation exceeds .30 (Tabachnick & Fidell, 1996). If the items of each subscale of Thai version have got factor loadings more than .30, it was interpreted as confirming that the Thai version replicated previous versions using Australian and American students.

Results

The reliability analyses produced Cronbach alpha scores between .64 to .90. These are within an acceptable range. The single factor analysis principal components analysis indicated that 130 items were high factor loading, while only 4 items were low factor loading (<.30).

Table 5: Factor Analysis: Low Factor-Loading Items

Items	Factor loading
1. I try to let things work out on their own. (Proactive coping Qno. 2)	<.30
2. I often see myself failing so I don't get my hopes up too high. (Proactive coping Qno. 9)	<.30
3. An important reason I do my work is so that I don't embarrass myself. (Ability-avoid goal orientation Qno. 8)	<.30
4. I tell myself that I will have enough time to talk to my professor, teacher's assistant, or classmates for help if needed, if I just get down (or back) to my studying. (Self-efficacy enhancement Qno. 21)	<.30

Vijver & Leung (1997) define bias as "nuisance factors threatening the validity of cross-cultural comparisons" (p 10) These may reflect as construct bias, method bias or item bias. In this case, the source of bias emerging from the factor analysis is likely to reflect item bias. Vijver & Leung (1997) cite four possible sources of item bias.

1. Poor item translation
2. Inadequate item formulation (eg. Complex wording)
3. Items invoking additional traits
4. Incidental differences in appropriateness of content (eg. Curricula differences)

Moreover, they note that there are various ways to deal with instrument and item bias. First, bias can be seen as an indicator that an instrument is inadequate for cross-cultural comparison. Alternatively, item bias can be seen as providing important clues about cross-cultural differences. Unbiased items define culture-common aspects of a construct and biased items denote cultural characteristics. Finally, the most common way to deal with item bias is to treat it as an interruption at the item level that has to be removed.

In this study, the four low factor-loading items were removed. The reliability was repeated and shows alpha scores between .67 to .90.

In conclusion, the validation process indicated an acceptable level of fit between the English and Thai versions of the questionnaires. Therefore, 130 questionnaire items were used for broader study examining potential cultural and disciplinary differences in self-directed learning among tertiary students across two cultures and two disciplines.

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