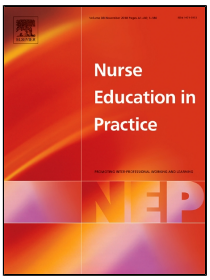
Accepted Manuscript



Translation and Validation Of A Vietnamese Version Of The Modified Clinical Learning Environment Inventory (V-CLEI)

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PII:	S1471-5953(17)30351-7
DOI:	10.1016/j.nepr.2018.11.019
Reference:	YNEPR 2492
To appear in:	*Nurse Education in Practice*
Received Date:	07 June 2017
Accepted Date:	28 November 2018

Please cite this article as: Hue T. Truong, Joanne Ramsbotham, Alexandra McCarthy, Translation and Validation Of A Vietnamese Version Of The Modified Clinical Learning Environment Inventory (V-CLEI), *Nurse Education in Practice* (2018), doi: 10.1016/j.nepr.2018.11.019

Title: TRANSLATION AND VALIDATION OF A VIETNAMESE VERSION OF THE MODIFIED CLINICAL LEARNING ENVIRONMENT INVENTORY (V-CLEI)

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Acknowledgments

The authors gratefully wish to thank Dr. Jennifer M. Newton for giving permission to use the survey tool. Sincere thanks to the translators for their translations, and to all the student nurses who participated in this study for sharing their time and experience.

Role of Funding Source statement

Financial support for the conduct of the research was provided by Australia Awards Scholarship. The sponsor had no involvement in the conduct of the research and preparation of the article.

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ABSTRACT

The quality of students' experiences in an education environment directly affect learning outcomes. In an applied profession such as nursing, students undertake work-integrated learning in unpredictable health settings where multiple influences interact. Understanding students' perspectives with a valid instrument is the first step in improving learning environments and maximizing learning outcomes. It is important that language and cultural nuances are accounted for when instruments are translated. This paper reports translation and psychometric properties of the Vietnamese language version (V-CLEI) of the modified English language Clinical Learning Environment Inventory (CLEI) (Newton et al., 2010). The V-CLEI was tested with a convenience sample of 209 Vietnamese nursing students to assess clinical learning experiences in hospitals in central Vietnam. The internal consistency, test-retest reliability, content validity and factor structure of the V-CLEI were examined. Results indicate that the V-CLEI is unlikely to be valid and reliable in the Vietnamese context and revision is required. This study informs research, particularly the different cultural dimensions considered when translating and adapting instruments.

KEY WORDS

V-CLEI; validation; nursing students; clinical environment

HIGHLIGHTS

- The modified CLEI was translated into Vietnamese using the back-translation method.
- Content validity and psychometric testing results of the V-CLEI were inconsistent.
- Further modifications and validation need to be undertaken for use of the V-CLEI.

MANUSCRIPT

INTRODUCTION

Vietnam is a nation in transition. It is experiencing rapid economic and social development, an increasing incidence of lifestyle-related disease and concomitant changes in the disease profile of the population (Ministry of Health, 2013). To meet these health challenges, government health sector and workforce reform is moving the nursing profession from a traditional medically-dominated model toward an autonomous licenced profession that uses nursing-specific benchmarks, such as the Vietnamese nursing competency standards (Ministry of Health, 2012). Over the past 10 years, nursing education has progressively moved from vocational two year college courses into higher education. Over 30 universities now offer three and four year bachelor degrees with embedded clinical practice learning. What remains unknown is if the current Vietnamese clinical environment meets the learning needs of students studying at this different level, and what improvements are needed to support students' attainment of new bench marks such as the national competency standards. This study aimed to translate a previously developed English language instrument, the Clinical Learning Environment Inventory (Newton et al., 2010) and investigate the reliability and validity of the new Vietnamese language version in collecting nursing students' perceptions of factors that facilitate of obstruct their learning in the Vietnamese clinical environment.

BACKGROUND

As an applied discipline, clinical practice experiences are essential to nursing students' development of competence. It is essential that students integrate theory with practice within real health situations to enable their learning. In Vietnam students

complete a range of such experiences in different health care settings throughout their course, under the supervision of either university teachers or clinical nurses. Due to human resource constraints in Vietnamese nursing schools, the ratio of teacher to student is often 1 to 50 or more, and university teachers who supervise students during clinical practice must move from ward to ward and organisation to organisation. Compared to some western contexts where teacher/student ratios are 1:10 or less (Bourgeois et al., 2011; McKenna and Wellard, 2004) this often results in low levels of supervision, with restrictions on clinical teaching and students' learning opportunities. Additionally, high patient/staff ratios, intensive clinical workloads and no remuneration for student supervision mean clinical nurses do not usually spend time teaching students. Such factors are known to contribute to an ineffective clinical learning environment (Dale et al., 2013; Saarikoski et al., 2009; Severinsson & Sand, 2010). Translation of existing English language tools that identify modifiable factors in the clinical learning environment that enhance or are a barrier to student learning will provide data to inform future improvement initiatives.

Numerous nursing instruments have been developed for assessment of specific aspects of clinical learning environments or climates. These include the Clinical Learning Environment Diagnostic Inventory (Hosoda, 2006), the Clinical Learning Environment, Supervision and Nurse Teacher scale (Saarikoski, et al., 2008), the Clinical Learning Environment and Supervision Instrument (De Witte, et al., 2011), and the Quality Clinical Placement Evaluation tool (Courtney-Pratt et al., 2014). However, these instruments measure discrete aspects rather than measuring the whole clinical environment that students experience. These instruments are not sufficiently broad in scope to capture data required to address the aim of this study. Therefore, the modified Clinical Learning Environment Inventory (Newton et al., 2010) derived from the Clinical Learning

Environment Inventory (Chan, 2002), was chosen for use. The modified CLEI (Newton et al., 2010) was selected in this study as it captures data from multiple dimensions of practice known to be salient to students' experiences as adult learners such as the quality of relationships within the workplace (De Witte, et al., 2011; Saarikoski, et al., 2008). Additionally, the modified CLEI emphasises student-centeredness, which is an important yet currently neglected aspect in Vietnamese nursing education (Gray, 2008). The modified CLEI consists of 50 items with six subscales. Validations undertaken by Chan (2003) and Newton et al. (2010) demonstrated adequate reliability and validity; however some issues of reliability were reported for the "Valuing Nursing Work" and "Innovative and Adaptive Workplace Culture" subscales of the inventory (Newton et al., 2010) and it is clear that further work is required. This study adds to the existing knowledge in this respect. Chan's (2002) version of the CLEI has been used internationally to assess nursing students' perceptions of the CLE in English speaking countries such as Australia (Henderson et al., 2010; Smedley and Morey, 2009), United Kingdom (Murphy, et al., 2012) and Hong Kong (Chan & Ip, 2007) and also has been translated into Italian (Perli & Brugnolli, 2009), Greek (Papathanasiou, et al., 2014) and Iranian (Rahmani et al., 2011), demonstrating its utility.

The modified CLEI comprises six subscales with a total of 50 items (42 original items and 8 parallel preceptor items): *Affordances and Engagement* (16 items), *Student-centeredness* (18 items), *Enabling Individual Engagement* (four items), *Valuing Nurses' Work* (three items), *Fostering Workplace Learning* (six items) and *Innovative and Adaptive Workplace Culture* (three items). This instrument had not been translated for use in the Vietnamese setting and its reliability and validity in this context was unknown. In addition, although the validation processes undertaken by Newton et al. (2010) demonstrated the modified CLEI has adequate overall reliability and validity in English language and Australian

practice contexts, some of the individual subscales had relatively low Cronbach's alpha values (Table 1). Therefore further testing of psychometric properties for all subscales with other datasets needed to be undertaken. This paper adds to knowledge of the psychometric properties of the modified CLEI.

METHODS

Translation procedures

In brief, the English version of the modified CLEI (Newton, et al., 2010) was translated into Vietnamese adhering to Brislin's back-translation model (Brislin, 1970), most recently outlined by Sousa and Rojjanasrirat (2011). Brislin's (1970) translation model is perhaps the best known method for translating research instruments in cross-cultural environments (Cha, Kim, & Erlen, 2007; Sousa & Rojjanasrirat, 2011; Squires et al., 2013; Symon et al., 2013). It is regarded as a reliable option for translating tools in cross-cultural research and is also appropriate for translating established questionnaires that have long been used in the original source language (Cha, et al., 2007; Erkut, 2010; Sousa & Rojjanasrirat, 2011). The translation entailed four steps: (1) forward translation, (2) backward translation, (3) comparison of the original and the backward-translated version of the Inventory, and (4) an expert panel review of the target language version for content validity (Figure 1). Various language expression adaptations were made in the V-CLEI during the translation and validation process. Within step four the translated Vietnamese version of the CLEI was assessed for relevance, clarity, comprehension, and appropriateness of the rating scale using a four point Likert scale by a panel of ten Vietnamese nurses: four from the university sector, two new graduates and four employed in health care. Expert panel assessment of the content validity of the V-CLEI yielded a minimum average item-level content validity

index (I-CVI) of 0.85. The average scale-level content validity index (S-CVI/Ave) was 0.995. This suggested that the V-CLEI was equivalent (Sousa & Rojjanasrirat, 2011) to the original English language version in terms of items in the inventory representing concepts.

Sample

A convenience sample of final-year students in a three-year nursing program at a Vietnamese nursing college were recruited in November 2014. Of 216 eligible participants who had recently completed clinical practicum, 209 completed the V-CLEI, equating to a participation rate of 97%. Of this sample, 185 (88.5 %) were female and 24 (11.5%) were male. The average age was 21 years (SD = 0.72). The median length of time students attended clinical practice was 8 days.

Twenty-five students who agreed at recruitment to be contacted again were randomly selected from the initial sample to complete the V-CLEI a second time, one week later, to examine test-retest reliability. While two weeks to a month is generally considered an acceptable timeframe for repeat administration (Waltz, Strickland, & Lenz, 2010). A shorter one-week re-test interval was chosen, as that was considered long enough for participants to not recall their answers from the first V-CLEI administration and not long enough for their perceptions to change substantially. Twenty-two students completed the V-CLEI for test-retest reliability.

Statistical analysis

The SPSS™ 21.0 software package and Amos 22.0 were used for statistical analysis. Descriptive statistics were used to summarise the demographic characteristics. Cronbach's α was chosen to assess the reliability of the V-CLEI (Pallant, 2013). Overall Inventory score and subscale α values were calculated (Connelly, 2011). The V-CLEI subscales assess

participants' subjective perceptions, therefore a Cronbach's α value of 0.70 was considered acceptable (Field, 2006; Pallant, 2013), although Kline (2013) notes that when dealing with psychological constructs, values below 0.70 can, realistically, be expected.

Intra-class correlation coefficients (ICCs) were chosen to determine test-retest reliability (Caceres et al., 2009; Shrout and Fleiss, 1979; Yen and Lo, 2002). Ideally, an ICC of at least 0.90 is recommended (Nunnally and Bernstein, 1994). However, other authors suggest that in a non-intervention study an ICC of 0.60 or even 0.50 is acceptable (Fayers et al., 2007; Polit and Beck, 2012). The Vietnamese language version of the CLEI assesses students' perceptions, which are subjective; therefore ICCs ≥ 0.50 were taken as the acceptable minimum in this exploratory study.

The factor structure of the Vietnamese language version of the CLEI (V-CLEI) was assessed using confirmatory factor analysis (CFA) to determine if the factor model identified by Newton et al. (2010) was maintained in the V-CLEI. To achieve a robust CFA, the ideal sample should be a ratio of at least five cases for each of the items (Pallant, 2013; Tabachnick and Fidell, 2013). In this study the CFA was conducted on 42 original items (eight preceptor items removed for comparison with model by Newton et al., 2010), therefore a sample of at least 210 participants was required to provide five respondents per item.

Ethical considerations

Ethical approval to undertake this study was granted by the Nursing College in Vietnam and the Australian University Human Research Ethics Committee in 2014.

RESULTS

Internal consistency

The overall Cronbach's α for all variables in the V-CLEI was 0.88. However, there was a substantial difference in the Cronbach's *α* values of the six subscales, which ranged from 0.19 to 0.75 (Table 1). *Affordances and Engagement* and *Student-centredness* scales were reliable with α values of 0.75 and 0.74 respectively. The *Enabling Individual Engagement* scale was less than the pre-determined threshold, at *α* = 0.60. Sequentially removing items from this subscale did not result in a substantial change in reliability. *Fostering Workplace Learning* scale was also below the acceptable level with *α* = 0.66, and the value was not improved with removal of any items. The reliability of *Innovative and Adaptive Workplace Culture* was lower at *α* = 0.58, and similar removal of individual items failed to increase the value. *Valuing Nursing Work* was the least reliable, with a coefficient α of only 0.19. Deletion of item 10 improved the *α* value to 0.23, however this was still far below the acceptable threshold. Various exploratory manipulations were attempted, such as removing and combining subscales; however, those changes did not improve the coefficient *α* to an acceptable level.

Test-retest reliability

The intra-class correlation coefficients (ICCs) for the five first subscales exceeded 0.50 ($p < 0.05$), which is the acceptable level for subjective measurements in this sample size (Fayers et al., 2007; Polit and Beck, 2012). However, the ICC for the *Valuing Nursing Work* subscale was 0.30 (95%, CI [-0.31, 0.78], $p = 0.085$), which is far below the acceptable cut-off point (Table 1). These results mean there is insufficient evidence to determine the test-retest reliability of this V-CLEI subscale.

Confirmatory factor analysis (CFA)

The V-CLEI included nine parallel items on nursing preceptors (*b*-items). However, these parallel items for preceptors were removed for confirmatory factor analysis purposes to replicate the analysis conditions used by Newton et al. (2010). The CFA therefore was conducted on data from 41 items.

For overall model fit, the model yielded $\chi^2 = 1486$ with $df = 764$, $p = 0.000$. The value for each of the fit indices did not reach the suggested cut-off value (Table 2). This suggested the V-CLEI did not provide a reasonable fit with Newton et al.'s (2010) six-factor structure model. The correlation matrix of V-CLEI subscales is provided in Table 3.

DISCUSSION

The content validity results derived from an expert panel assessment initially suggested that the V-CLEI was a relevant and culturally appropriate instrument. The overall V-CLEI content validity index of 0.995 was acceptable (Polit and Beck, 2006; Polit et al., 2007; Sousa and Rojjanasrirat, 2011), indicating that the constructs within the V-CLEI would be easily understood by Vietnamese nursing students. However, psychometric testing results of the V-CLEI (Cronbach α, test-retest reliability and CFA) provide insufficient evidence for a valid and reliable instrument in the study sample. There are several potential reasons for this.

First, inconsistencies between the content validity results derived from an expert panel and the low reliability statistics could be the result of the Asian cultural notion of 'saving face'. Saving face refers to preserving one's own or others' sense of self, dignity or prestige in social situations (Ho, 1976). The panellists might have rated items highly to avoid a perception of negative criticism of the V-CLEI or the researcher, irrespective of whether they thought the items were inappropriate or incorrect. The Sousa and Rojjanasrirat (2011)

guideline of instrument translation in cross-cultural research was developed in the United States, therefore the authors might not have considered the Asian cultural practice of avoiding apparent criticism. It is advisable in future for Vietnamese studies to carefully instruct panel participants who assess the content validity of translated instruments to limit this cultural influence.

An alternative explanation could be that the cultural norms in which Vietnamese education is embedded influenced the way students responded to V-CLEI items. The study participants have long been educated in a teacher-centred environment where it is not considered acceptable to argue or challenge what is presented by teachers or the *status quo* (Marambe et al., 2012). In such an environment, students might not dare to make strong judgements about their teachers as well as the learning environment they are provided with, even in an anonymous survey. Similarly, they might not be aware that they could critique their teachers without repercussions, or they might hesitate to agree with statements within the V-CLEI when it is culturally inappropriate for them to challenge what teachers say and do.

Third, the modified CLEI was developed in the Australian cultural context and designed to capture Western nursing students' perceptions. It could be that the cultural norms embedded in the Western version do not hold in the Vietnamese setting (Van de Vijver and Tanzer, 2004). In particular, the subscales *Enabling Individual Engagement, Fostering Workplace Learning, Valuing Nursing Work* and *Innovative and Adaptive Workplace Culture* could evaluate aspects of the practice environment that are incongruent with the norms and values of Vietnamese culture. For example, *Enabling Individual Engagement* assesses students' control over their clinical practice experience, essentially

'having a voice' or 'being heard'. This might not be a familiar concept to Vietnamese students, who have long been educated in large group environments in which they are expected to passively receive instruction from teachers with little individualisation or personal choice (Pham, 2010). Likewise, the constructs articulated in items within the *Valuing Nursing Work* sub-scale might be unfamiliar to participants due to the comparative disenfranchisement of the nursing profession in Vietnam (Jones et al., 2000). The V-CLEI therefore could possibly represent concepts that are not well understood or applied in the Vietnamese nursing context, and poor psychometric properties have resulted. This argument is strengthened by the lack of construct equivalence of the V-CLEI as demonstrated in the confirmatory factor analysis results, which did not support Newton et al.'s previously identified six-factor model. These elements all indicate that the constructs underpinning the original Inventory and the V-CLEI might not translate well to the present study setting.

Fourth, the poor reliability of the V-CLEI could be a result of translation procedures that culminated in item non-equivalence (item bias) (Van de Vijver and Tanzer, 2004). This study adhered to a back-translation model that is widely regarded as a reliable method for translating tools in cross-cultural research. Nonetheless, the panellists' interpretation of items in the V-CLEI could still differ from that of the participants (e.g., the panellists were predominately nursing educators and qualified nurses rather than students). Even a linguistically correct translation can be incongruent with the psychological and cultural aspects of education as perceived by the intended participants (Van de Vijver and Tanzer, 2004). Thus, item bias could be a clue to the poor reliability of the V-CLEI in this study.

Regarding the reliability of the instrument, the α values of V-CLEI subscales in this study had a similar pattern to those reported in Newton et al.'s work (Table 1). That is, only the two first subscales *Affordances and Engagement* and *Student-centreness* reached an acceptable level at 0.70 (Field, 2006; Pallant, 2013); while others were all lower than the cut-off point (0.70).

With this in mind, for future research with the V-CLEI, the first two subscales (*Affordances and Engagement* and *Student-centredness*) seem to be reliable in the study context with high internal consistency and stability. It is therefore possible that only the first two V-CLEI subscales accurately measure nursing student's perceptions of the clinical learning environment in Vietnamese contexts. This suggests that a Vietnamese research tool to investigate the issue should be developed based primarily on the first two subscales of the V-CLEI tested here. Nonetheless, α values are very much a function of the number of items in a scale (Cortina, 1993). Empirical evidence suggests that if an instrument or scale has many items, as these two scales do, it can have high α values even when the average correlation among items is very small, and different constructs are in fact measured (Kottner and Streiner, 2010, Cortina, 1993). Further validation should therefore be conducted with respect to these two subscales.

LIMITATIONS

This study was limited by the time constraints of Masters-level study. That is, the instrument was not able to be piloted in a Vietnamese-speaking population prior to large scale administration, which might have enabled improvement of the psychometric properties of the V-CLEI. This study was conducted in only one Vietnamese nursing college;

therefore, the results might not be generalisable to other nursing institutions across Vietnam.

CONCLUSIONS

This is the first time the psychometric properties of the modified CLEI have been examined in Vietnam. The present V-CLEI is unlikely to be valid and reliable in the Vietnamese context. Further modifications of the V-CLEI need to be undertaken to produce a suitable instrument to explore Vietnamese clinical learning environments as perceived by undergraduate nursing students.

CONFLICT OF INTEREST STATEMENT

Financial support for the conduct of the research was provided by an Australia Awards Scholarship. The sponsor had no involvement in the conduct of the research and preparation of the article.

Table 1

Internal consistency and Test-retest reliability for V-CLEI subscales

Subscale	Number of items	(Cronbach's α)		Test-retest reliability (Intra-class Correlation)					
		The modified CLEI	The V-CLEI	Intra-class Correlation[b]	95% Confidence Interval		F Test with True Value		
					Lower Bound	Upper Bound	Value	df1	df2	Sig
Affordances and Engagement	16	0.88	0.75	0.65[a]	0.33	0.84	4.67	21	21	0.000
Student-centredness	18	0.88	0.74	0.67[a]	0.37	0.85	5.09	21	21	0.000
Enabling Individual Engagement	4	0.65	0.60	0.58[a]	0.21	0.80	3.62	21	21	0.002
Valuing Nursing Work	3	0.57	0.19	0.63[a]	0.31	0.83	4.50	21	21	0.001
Fostering Workplace Learning	6	0.67	0.66	0.52[a]	0.15	0.76	3.47	21	21	0.003
Innovative and Adaptive Workplace Culture	3	0.50	0.58	0.30[a]	-0.13	0.64	1.84	21	21	0.085

Note. Two-way mixed effects model where people effects are random and measures effects are fixed.

a. The estimator is the same, whether the interaction effect is present or not.

b. Type A intra-class correlation coefficients using an absolute agreement definition.

c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

Table 2

Suggested and results CFA Good-of-fit indices

Test	Cut-off	Sources	Results
Chi-square (χ^2) / Degree of freedom	$p > 0.05$	Barrett (2007)	1.95 (p =0.00)
Root Mean-Square error of Approximation (RMSEA)	RMSEA < 0.07	Steiger (2007)	0.098
Comparative Fit Index (CFI)	CFI > 0.95	Hu and Blentler (1999)	0.000
Parsimonious Normed Fit Index (PNFI)	PNFI >0.95	Mulaik et al. (1989)	0.000

Table 3

Covariance matrix of V-CLEI subscales

	Enabling Individual Engagement	Innovative and Adaptive Workplace Culture	Student-centredness	Fostering Workplace Learning	Affordances and Engagement	Valuing Nursing Work
Enabling Individual Engagement	0.037					
Innovative and Adaptive Workplace Culture	0.017	0.146				
Innovative and Adaptive Workplace Culture	0.021	0.025	0.115			
Fostering Workplace Learning	0.077	0.065	0.068	0.180		
Affordances and Engagement	0.009	0.013	0.019	0.025	0.009	
Valuing Nursing Work	0.011	-0.032	0.075	0.041	0.013	0.047

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CONFLICT OF INTEREST STATEMENT

Conflict of interest: None

ROLE OF FUNDING SOURCE STATEMENT

Financial support for the conduct of the research was provided by Australia Awards Scholarship.

The sponsor had no involvement in the conduct of the research and preparation of the article.

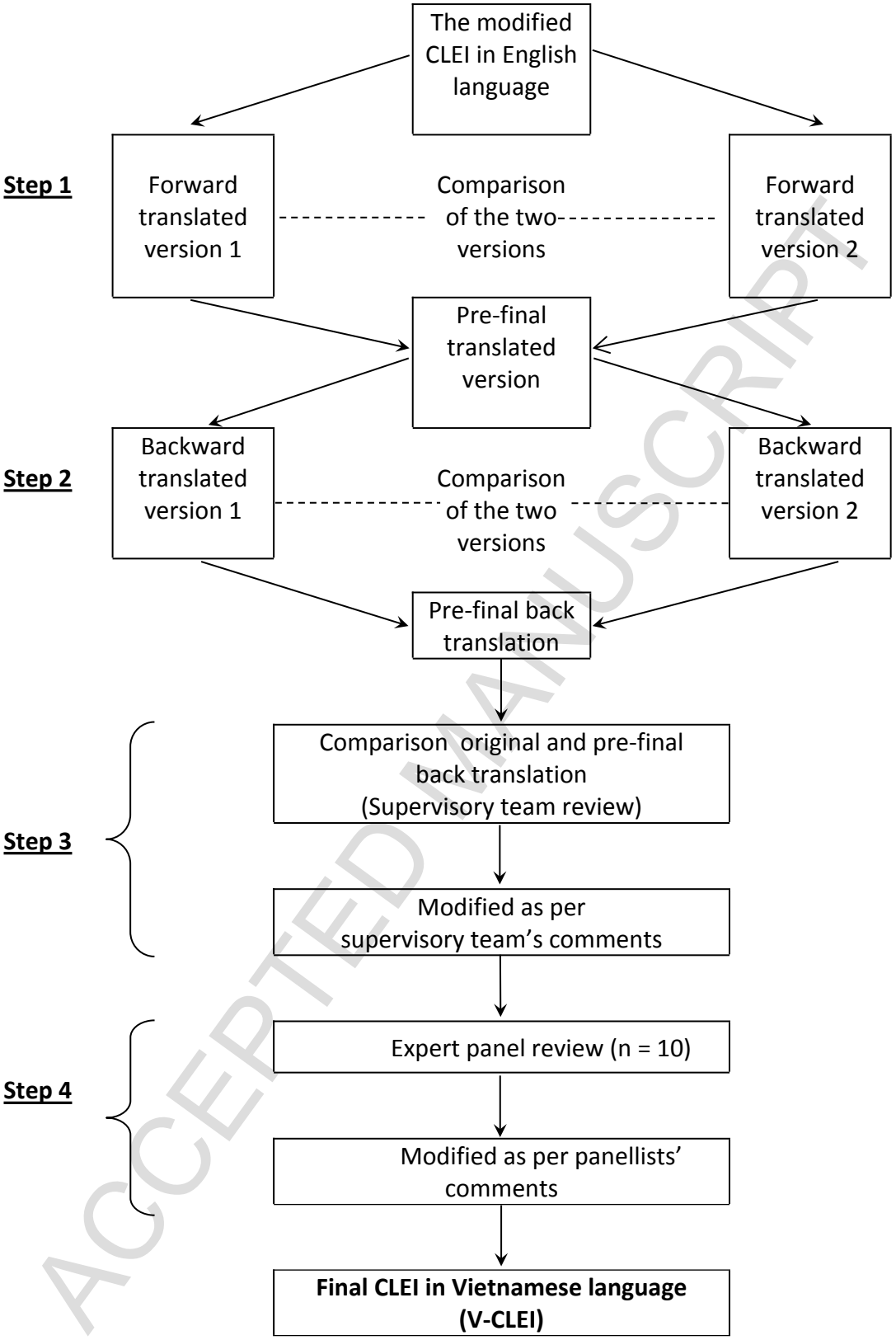

Figure.1. Translation process adapted from Sousa and Rojjanasrirat's guideline (2011).