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Measuring Attitudes of Vietnamese Parents and Students to Schooling

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Abstract

The attitudes of parents and students towards schooling are often considered to be important factors associated with students' educational outcomes. To evaluate the extent to which attitudes influenced students' outcomes, it was important to have appropriate measures of attitudes. Up to date in Vietnam, parents and students' attitudes have generally been assessed by one item asking how they felt about school. This paper presents the process of constructing and calibrating two scales to measure the attitudes of students and parents, and then linking these two scales to compare the two groups.

Previous research in Vietnam supported the proposition that development and opportunity were important aspects that parents and young people valued and expected from education. Therefore, to measure attitudes to schooling, a set of items which covered both development and opportunity aspects of education was designed. After the items were trialled, a final version of the 13 items was compiled. The two scales were shown to have logical, face, content and construct validity. Parents and students surveyed can be grouped into five levels of attitudes: "negative", "development", "strong belief in development", "opportunities" and "positive". The proportions of parents and students included in each level were different, but these differences were minor. The similarity in response to each item added weight to the argument that the two constructed scales were valid.

This study examined attitudes to school of parents and students in a remote Vietnamese rural setting. In order to measure and compare attitudes, it was necessary to develop a scale that measured the same trait in the two samples. While this seemed obvious it was, in fact, not straightforward. Such a comparison rests on several assumptions. First, both students and parents are assumed to come from the same population and this is problematic in a measurement sense; second, a set of attitude scale items is needed that can be responded to by both groups but the kinds of value attributed to the school by students might not be the same as those to which a parent might respond. Hence, even with a common target for attitude measurement, it is not possible to assume that the same set of items would apply, but in using different items it would be necessary to demonstrate that the scales were measuring the same construct. Once these conditions were met and assumptions satisfied it would be possible to directly compare the data from the two groups and interpret similarities or differences in the mean scores of the two different samples. Thus, there was a potential measurement problem that needed a preliminary resolution, and the measurement assumptions and properties of the scales needed to bear examination before any comparisons were justified.

The Measurement Model

Wright and Masters (1982) defined the characteristics that measurement should have. They listed four requirements as direction, order, magnitude and replicable units. A questionnaire and an attitude scale is a measurement instrument and, like all other measurement instruments, it must be accurate, reliable and have known tolerance or error limits. Estimating these characteristics is called calibration. As Thurstone required in 1904, the trait being measured should not affect the measurement instrument and the measurement instrument should not affect the trait being measured. Furthermore, the measure obtained of the trait should not be affected by which instrument is used, given that we know the error and accuracy levels of the instrument. Any one of a set of equivalent instruments should give a measure of the trait consistent with measures obtained with any other equivalent instrument. If a scale is affected by the people who use it, or are assessed by it, its validity is threatened. "Within the range of objects for which the measuring instrument is intended, its function must be independent of the object of measurement" (Thorndike, 1947). This property is known as specific objectivity. For specific objectivity to hold, a measurement must be independent of the measuring instrument and the instrument must function independently of the traits measured.

Rasch (1960) first understood the possibilities for objectivity in measurement. He proposed a logistic response model with one item parameter and one person parameter, and was the first to apply this type of model to the analysis of test data. The approach requires that we know what it is that we are measuring, that there are units of measurement, and that we can link the probability of obtaining a specific answer to a specific item to a persons' ability in the domain we are measuring. There are several things that are prerequisite in this. The domain of interest or the target for the attitude measurement needs to be operationalised. To achieve this, tasks or items are required that can be ordered in terms of the amount of attitude or opinion they demand in order to agree with the substance of the item. When a scale is argued to measure satisfaction with school, for instance, the variable (satisfaction) is defined and questions or items that are indicators of satisfaction are located at different levels on the variable.

The location and interpretation of the levels on the variable represent the contribution of an item response model analysis over other forms of empirical calibration. Rasch analysis assists in constructing a variable (measure) from a dominant dimension (factor) in the data. This dominant dimension may be a hybrid of several constructs, as in the case of the attitude to school construct. In these circumstances, the dominant factor will reflect a composite scale (satisfaction). Lesser dimensions are reported as misfit to the Rasch model. Conducting a factor analysis using the original observations can lead to misleading results because when observations are non-linear they can, according to Wright (1996), generate illusory factors. Linacre (1998) also argues that exploratory factor analysis can report items clustering at different performance levels as different factors and that there is no way of knowing from factor analysis alone whether each factor is a dimension or a slice of a shared dimension. Factor loadings are correlations of existing data with a latent vector constructed to minimise residuals, but the loadings are not on a linear metric. They constrict between -1 and +1 and any plots they may be cast in are coordinates rather than maps of a variable. No approach to factor analysis provides measures of location on the variable and this prohibits the interpretation of levels of satisfaction.

Rasch analysis constructs linear measures and helps to identify a core construct inside a milieu of colinearity. This is the message of a 1996 issue of *Structural Equation Modelling* that contains four articles on the connections between Rasch and exploratory factor analysis. Wright (1996), for instance, noted that both misfit to the Rasch model (dimensionality) and the extremities of the unidimensional variable are reported as minor factors by principal component analysis. Further, factors are produced by fluctuations in measurement error variance. When a factor cannot be confirmed or established by Rasch analysis, its existence is doubtful. Smith (1996) used simulation to investigate which technique was better at discovering dimensionality. When a small number of highly correlated factors dominate the data, or if one factor dominates, the use of Rasch analysis is recommended. Once a factor has been identified, the advice was to separate its items out of the instrument and use Rasch analysis to analyse them further in order to interpret the variable (see Goekoop & Zwinderman, 1994). Chang (1996) also demonstrated that Rasch and factor analyses produced similar results, but that Rasch results were simpler to interpret, more stable and informative. Factor analysis identifies the relationship to the underlying variable, but not the location on it. Rasch analysis, in contrast, provides item and person location on the variable, facilitating the development of a construct theory and interpretation of levels of satisfaction. A vague factor structure can result in Rasch and factor analysis suggesting different factors (Green, 1996). If different variance partitioning, rotation and obliqueness, are used by different analysts, then different factor analyses can produce different factor structures. The nature of a factor solution largely depends on the decisions for the extraction and rotation process, where exploratory factor analysis is concerned. In this project we have not used exploratory factor analysis. Confirmatory analysis, however, can form an important part of the analysis and strongly supports item response modelling, but it still fails to provide interpretative information about levels of satisfaction or measures of location on the variable.

In every attitude scale development procedure the question arises regarding the use of negatively worded items. The Rasch approach does not support this. The discussion above noted that the variable is defined and then items are placed along the variable indicative of the level of satisfaction required to elicit an agreement. Using items as indicators of location

obviates the need for considering negated items. Apart from this, there is a growing body of evidence that discourages this practice. Wright (1995) points out that

'NO' is not at all the opposite of 'YES'. What we hate is not the opposite of what we love. Negation releases repression (Freud 1922). Affirmation acquiesces to custom. Every empathic therapist and father confessor knows that what the patient denies is not the opposite of what they confess . . . (p.3).

Interpreting a negation as a positive statement is usually achieved with reverse coding, but according to Wright this is incorrect. Wright and Masters (1982) displayed and discussed just such an example. Ebel also wrote about "true" not measuring the opposite of "false" 15 years ago, and Grosse and Wright (1985) argued against reverse coding approaches to negation in discussing validity and reliability of true-false tests. Accordingly, negation has not been used in the development of the satisfaction scale. This approach has emphasised dimensionality, accuracy, location on the variable, and interpretability.

In this study, the Rasch model was used to predict response patterns to all items by all respondents. The extent to which this prediction succeeded is a measure of the fit of the model to the data. Where the data is shown to misfit, it is a signal that the item data needs to be examined and, in most cases, the item is excluded from the scale. The rationale for the omission is based on the assumption that the relationship between satisfaction and the likelihood of a specific response pattern is consistent across items. Where this relationship breaks down, it is assumed that the item is measuring a separate variable. Misfit statistics are standardised mean square differences between observed and expected or predicted values. They have an expected value of 1.0 and accepted range of values between 0.77 and 1.30. Values below 0.77 are regarded as an indication of an item that is deterministic in nature, or that there is dependence on another item or, alternatively, that there is redundancy in the scale. Items with misfit values in this range have a relationship between satisfaction and a score category that is too high. Values above 1.30 indicate a low relationship between satisfaction and score. That is, the score assigned does not seem to be related to the overall scale or variable. This could indicate random response, or an item that all, or perhaps no, respondents agree with (the item is too easy or too difficult). The differences between the observed and predicted response patterns are used to calculate the fit statistics. These differences are called the residuals. Residuals are further examined through tests of fit to the model.

Attitudes to School

The attitudes of parents towards schooling are often considered to be important factors associated with students' educational outcomes such as achievement (Alexander, Entwisle and Horsey, 1997; Carbonaro, 1998; Keeves, 1972) and propensity for completing school (Alexander et al.; Dang, 1994; Garnier, Stein and Jacobs, 1997; Kulkarni, 1996; Nguyen, 1998; National Institute for Educational Sciences, 1998; Thai, 1992; To, 1994; Tran, 1994; UNESCO, 1992). Students' attitudes towards schooling are also regarded as important factors associated with student achievement (Marks, 1998; Dang, 1992; Keeves; Worrell & Hale, 2001) and school completion (Ainley, Batten and Miller, 1984a, 1984b; Marks, 1998; Rosier, 1978; Rumberger, 1995). To evaluate the extent to which attitudes influenced students' outcomes, it was important to have appropriate measures of attitudes. In Vietnam, attitudes to schooling have generally been assessed using a single item asking how parents or students felt about school (Thai, 1992; Tran, 1994). By contrast, this paper presents a process of

constructing and calibrating attitude scales to measure students and parents' attitudes. These two scales were equated to compare attitude strength of the two groups.

Identifying the Variables

The first step was to mark out the variable along which measures were to be made (Wright & Masters, 1982) or to establish an hypothesis of what is being assessed (Griffin & Gillis, 2001). A continuum was proposed for each of the two measures, parents' attitudes (PA) and students' attitudes (SA). The constructs were assumed to be measurable, have direction and levels of magnitude (Corcoran, McKenna, McDonald, Griffin, Pitman, Wilson, Sharplin, Hazel, Oladejo, Langenberg, Watts & Voros, 1996; Nguyen, 1997).

Previous studies in Vietnam targeting development and opportunity aspects of students' education identified the acquisition of high qualifications, being knowledgeable, having a job (particularly a pleasant job), ability to earn a good living, and having a suitable and secure marriage as important aspects that Vietnamese parents and young people value and expect as outcomes of a successful education (Thai, 1992,1996; Tran, 1994; Nguyen, 1998). Thus, measures of attitudes to schooling need to cover both development and opportunity aspects of education. Accordingly, Nguyen (2002) proposed that the scales should cover four developmental levels of attitudes as presented in Table 1.

Table 1

Intended Scale to Measure Attitudes to School

Level	Content
Negative	The school cannot help students develop and provide them with opportunities.
Development	School helps students develop but the school cannot provide students with opportunities
Opportunities	The school helps students develop and can provide students with some limited opportunities
Positive	The school can help students develop and provide them with many opportunities.

The Items

A set of items covering the development and opportunity aspects of education was expected to be ordered along a developmental continuum and to map onto four levels of attitudes. A set of 13 items was used. The scales were administered to 599 students and their parents in rural Vietnam. The items presented in Table 2 show that a four-point response scale was used.

Table 2

Indicators to Measure Parents and Students' perceptions of School

Indicators		Strongly agree	Agree	Disagree	Strongly disagree
Codes		3	2	1	0
1.	Knowing how to behave	0	0	0	0
2.	Knowing the secret of life long living	0	0	0	0
3.	Being accepted by a tertiary institution or technical college	0	0	0	0
4.	Gaining affection from others	0	0	0	0
5.	Having an easy and well-paid job	0	0	0	0
6.	Having a job in urban areas	0	0	0	0
7.	Becoming rich	0	0	0	0
8.	Going overseas	0	0	0	0
9.	Having a high position	0	0	0	0
10.	Being successful in further education levels	0	0	0	0
11.	Having skills necessary for life	0	0	0	0
12.	Knowing how to do business	0	0	0	0
13.	Well-rounded improvement	0	0	0	0

*Evaluation of Items**Parents' Attitudes (PA)**Parameter estimates and fit statistics.*

The data were analysed using the Rasch Rating Scale model (Wright & Masters, 1982) using the software package Quest (Adams & Khoo, 1996). Table 3 presents the calibration statistics for the two scales. The first column presents item numbers of items measuring the variable PA. The next six columns present threshold parameters for each item and measurement errors. The last column presents the mean square infit.

Table 3

Item Parameter Estimate: Positiveness, Measurement Error and Infit (PA scale)

Item	? ₁	SE ₁	? ₂	SE ₂	? ₃	SE ₃	Infit
1	-5.09	0.75	-2.64	0.3	0.1	0.18	0.91
2	-4.28	0.47	-1.59	0.23	0.47	0.18	1.01
3	-1.19	0.19	1	0.18	2.23	0.23	0.86
4	-3.41	0.34	-1.8	0.23	0.57	0.17	1.12
5	-1.44	0.19	0.92	0.18	2.53	0.22	1.03
6	0.38	0.19	2.25	0.23	4.00	0.37	0.92
7	-0.59	0.16	1.15	0.19	2.89	0.25	1.08
8	1.5	0.22	2.9	0.32	4.25	0.46	1.14
9	-0.22	0.16	1.8	0.24	3.06	0.29	0.9
10	-1.06	0.19	1.06	0.18	2.74	0.24	0.99
11	-2.88	0.25	-0.79	0.2	1.23	0.19	1.05
12	-4.72	0.56	-1.94	0.23	0.47	0.17	0.87
13	-3.88	0.38	-1.14	0.22	1.07	0.2	1.06

The measurement errors are small and the infit values are all within the range of 0.77 to 1.3. Thus, there was evidence that a single underlying dimension in the variable was measured. Summaries of fit statistics of person and item estimates are presented in Table 4.

Table 4

Fit Statistics of the Scale of Parental Attitudes

Category	Item Estimates	Case Estimates
Infit Mean Square		
Mean	1.00	0.99
SD	0.09	0.59
Outfit Mean Square		
Mean	1.01	1.01
SD	0.11	0.69

Column 2 in Table 5 (item estimates) presents infit and outfit mean square statistics of items, while column 3 (case estimates) presents infit and outfit mean square statistics of people in the sample. For each of the columns, the mean and standard deviation (SD) of item estimates and case estimates are presented. The internal consistency index of this set of items was 0.90. Table 5 briefly summarises item and case separation reliability estimates of the PA scale.

Table 6

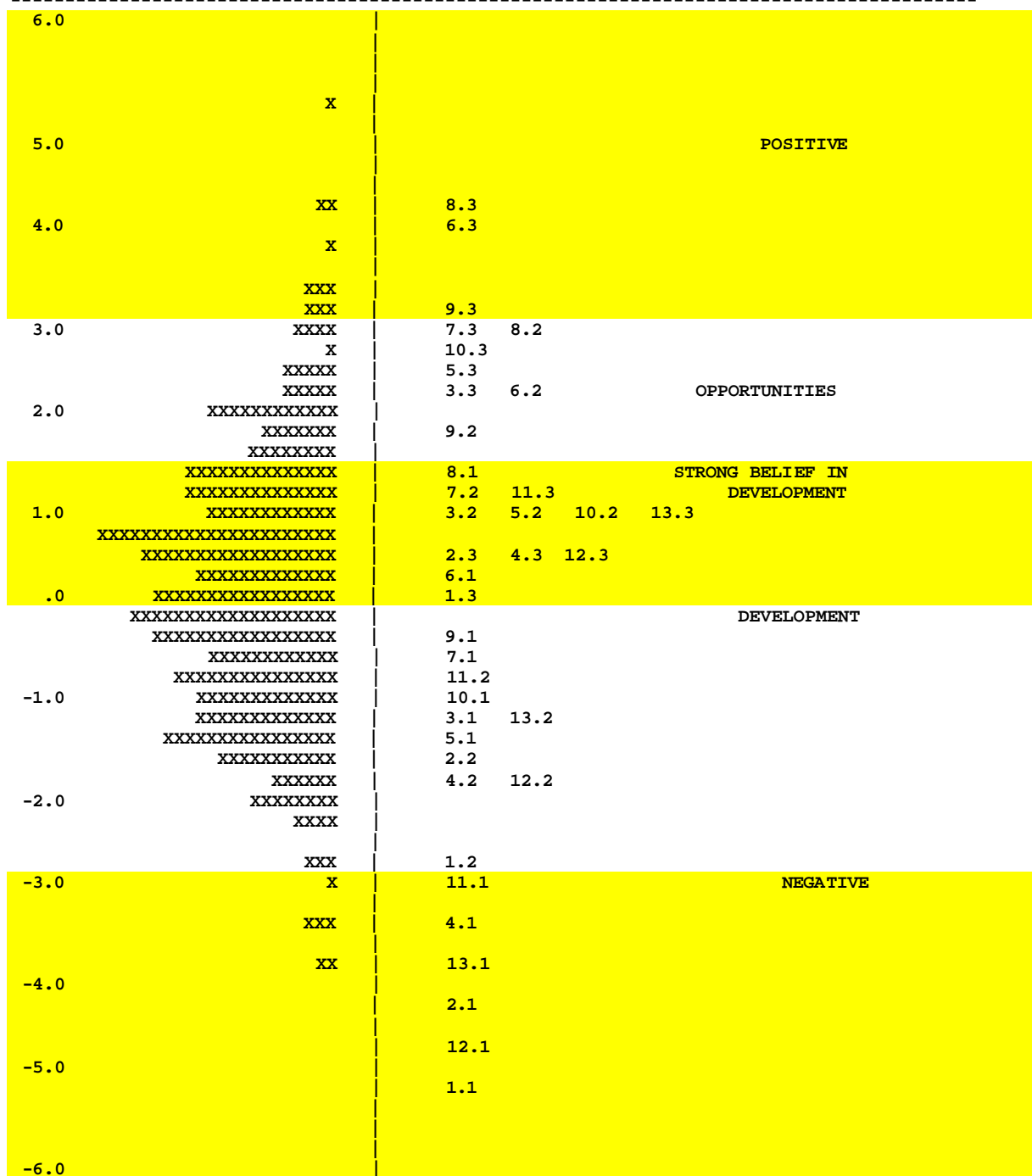
Summary of the Estimates of the Scale of Parental Attitudes

Category	Item Estimates	Case Estimates
Mean	0.00	0.18
SD	1.77	1.45
Reliability of Estimates	0.98	0.90

The mean item demand estimate was arbitrarily set to zero, while the mean attitude to school for parents was 0.18. The variance of item demand levels was 1.77 logits and the variance of parents' estimates was 1.45. The fact that these two values are almost equivalent indicates that the item demand range was matched to the range of parents' attitudes. The item and case separation reliabilities of the variable PA were relatively high: 0.98 and 0.90 respectively. The 13 items were thus well separated on the continuum, supporting evidence of construct validity (Wright & Masters, 1982).

Interpretation of the PA variable map.

The Rasch analysis output is presented in Figure 1. On the left of the map is the scale ranging from -6.0 to +6.0. This was the width of the logit scale of the Rasch model and the measures represent the logarithm of the odds of a parent having an attitudinal level at least k rather than k-1 within each item. The variable map also represents the estimates of the levels of parents' attitudes, represented by Xs, and the difficulty of the item score level, represented by x.y notation on the right of the map. In the x.y notation, the x represents the item number and y represents the score obtained. For example, 5.3 represents a score of 3 on item 5 or, in other words, parents selecting category 3 on item 5.



Each X represents 2 students

Figure 1. Variable map of parental attitudes to schooling.

Analysis of the relative item positions suggested five levels (or bands) of attitude among parents, from negative to strongly positive. An interpretation of the thresholds clustered at the lower end indicated negative attitudes to school in terms of its potential to help students to develop their life skills. The “negative” band included only 2.1% of the parents.

In the second band, the thresholds indicated a parent’s belief in the potential of a school to help students obtain knowledge and skills or to develop, but others indicated that schools did not provide opportunities for students in the future. Thus, parents in this band were those who *agreed* with the view that school helped students to develop some knowledge and skills but *did not agree* that school could provide students with life opportunities. This second band was described as “development” and included 43% of the parents in the sample.

In the third band, the thresholds indicated positive attitudes towards the potential of school to help students obtain knowledge and skills. Other thresholds related to parents’ belief in opportunities. Still others indicated that parents felt that schools could not provide students with opportunities to have a job in urban areas or to go overseas. Thus, parents in this band were those who indicated that school could help students to develop knowledge and skills and could provide them with some life opportunities. This band was described as “belief in development”. A total of 37.2% of parents belonged in this band.

The set of thresholds clustered in the fourth band indicated that parents held a strong belief that school could provide students with opportunities such as “having an easy and well-paid job in the future”, “being accepted by a tertiary institution or technical college”, “being successful in further education”, and “becoming rich”. They agreed that school could provide students with opportunities such as “going overseas” and “having a job in urban areas”. Thus, parents in this band believed that the school would help children to develop and secure opportunities. Thus, this band was described as “opportunities” and included 14.2% of parents.

Thresholds clustered at the fifth band indicated parents’ belief that school provides students with opportunities such as having a high level position, a job in urban areas and overseas travel. That is, schools help children to develop, and provide children with numerous opportunities. This band was described as “positive”. This band included 3.4% of parents.

This method of interpretation provided a description of the underlying developmental construct and enabled a comparison with the original hypothesised construct described in Table 1. Table 6 presents the comparison of the hypothesised and derived constructs. The match is close, despite the fact that there are five levels in the derived and four in the hypothesised construct. The fact that the content analysis *back translated* to approximate the original hypothesised construct is further evidence of the construct validity of the scale (Griffin & Phan, 2001).

Table 6

Comparisons of the Hypothesised and Derived Constructs of PA

Original construct	Derived construct
1.School cannot help students develop and provide them with opportunities	1. School cannot help students develop and provide them with opportunities
2. Agree with the point that school helps students develop but disagree with the point that school can provide students with opportunities	2. Agree with the point that school helps students develop but disagree with the point that school can provide students with opportunities for the future
3. Strongly agree with the point that school helps students develop and agree with the point that school can provide students with many opportunities	3. Strongly agree with the point that school helps them develop and agree that school provides them with some opportunities.
	4. Strongly agree with the point that school helps students develop, agree that school provides them with many opportunities and strongly agree that school provides them with some opportunities
4. Strongly agree with the point that school can help students develop and provide them with many opportunities	5. Strongly agree with the point that school helps them develop and provides them with many opportunities

*Students' attitudes (SA)**Parameter estimates and fit statistics (SA).*

Table 7 presents the calibration statistics for the students' attitudes scale (SA).

Table 7

Item Parameter Estimates - Demand, Measurement Error and Infit of variable SA

Item	γ_1	SE ₁	γ_2	SE ₂	γ_3	SE ₃	Infit
14	-5.13	0.66	-2.2	0.24	-0.09	0.15	1.01
15	-4.03	0.38	-1.59	0.21	0.32	0.17	0.91
16	-1.22	0.19	1.27	0.21	2.45	0.25	0.88
17	-3.75	0.34	-1.66	0.22	0.87	0.16	1.25
18	-1.72	0.19	1	0.19	2.31	0.24	1.08
19	0.25	0.19	2.22	0.26	3.75	0.41	0.79
20	-0.56	0.16	1.44	0.19	3.06	0.29	1.07
21	1.41	0.22	2.82	0.35	4.12	0.54	0.87
22	-0.19	0.19	1.83	0.2	3.37	0.34	0.84
23	-1.06	0.19	1.2	0.18	2.85	0.26	1.05
24	-3.44	0.31	-0.8	0.2	1.16	0.19	1.02
25	-5.25	0.66	-1.89	0.24	0.39	0.19	0.90
26	-3.56	0.31	-1.03	0.2	1.08	0.15	1.09

Table 7 shows that all 13 SA items have infit values between the range of 0.77 to 1.3, providing evidence of a single underlying dimension in the variable being measured.

Summaries of fit statistics of person and item estimates are presented in Table 8.

Table 8

Fit Statistics of the Scale of Students' Attitudes (SA)

Category	Item Estimates	Case Estimates
Infit Mean Square		
Mean	0.98	0.98
SD	0.13	0.53
Outfit Mean Square		
Mean	1.02	1.02
SD	0.20	0.88

The infit (weighted) and outfit (unweighted) mean square of both item and case estimates were close to 1. Thus, the data were compatible with the model. The internal consistency index of this set of items is 0.89.

Table 9 summarises item and case separation estimates for the SA scale.

Table 9

Summary of the Estimates of the Scale of Students' Attitudes

Category	Item Estimates	Case Estimates
Mean	0.00	-0.03
SD	1.77	1.37
Reliability of Estimates	0.98	0.88

The mean item positiveness was arbitrarily set to be zero while the mean students' attitudes was -0.03. The variance of item positiveness levels is 1.77 and the variance of students' attitudes estimates is 1.37. Thus, the set of items designed were relatively well matched to the range of students' attitudes.

The item and case separation reliabilities of the variable SA were relatively high: 0.98 and 0.88 respectively. The 13 items were well separated on the continuum. Similarly, the scale appears to differentiate between students' attitudes.

Figure 2 indicates that the 13 sets of item thresholds formed several clusters that exhibit different levels of positive attitudes towards school. Similar to the PA scale, analysis of the relative positions and content of the threshold clusters suggested five levels of attitudes among the population investigated, from the bottom end (negative) to the top end (strong belief in opportunities).

The first band (at the lower end) was described as “negative” and included 5.2% of the students. The second band included 39.7% of the students in the sample and was described as “development”. The third band was described as “strong belief in development” and included 43.2% of the students. The fourth band included 10.3% of the students and was described as “opportunities”. The fifth band included 1.5% of the students and was described as “positive”.

The content analysis of the variable SA identified the nature of the constructed or derived variable. In comparison to their parents, more students had negative attitudes towards school helpfulness for their future. Second, the majority of students held the view that school helped them develop some or all of the potential opportunities and attributes listed in the questionnaire. Third, about half (55.1%) of the students believed that the school could provide them with some or all of the opportunities listed in the questionnaire. However, only 1.5% thought that school could both help them develop knowledge and skills and provide them with opportunities in the future.

The match between the original hypothesised and the derived constructs was close, despite the fact that there are five levels in the derived and four in the hypothesised variables. This is taken as further evidence that the set of 13 items is measuring a single and identifiable construct.

Comparison of the Two Measures: Parents’ Attitudes and Students’ Attitudes

Figure 3 presents the scatter plot of the thresholds of categories of each item included in a set of items measuring the variables SA and PA. The fact that almost all the dots are within a 95% confidence interval shows that the SA and PA item sets behaved very similarly in the groups of parents and students.

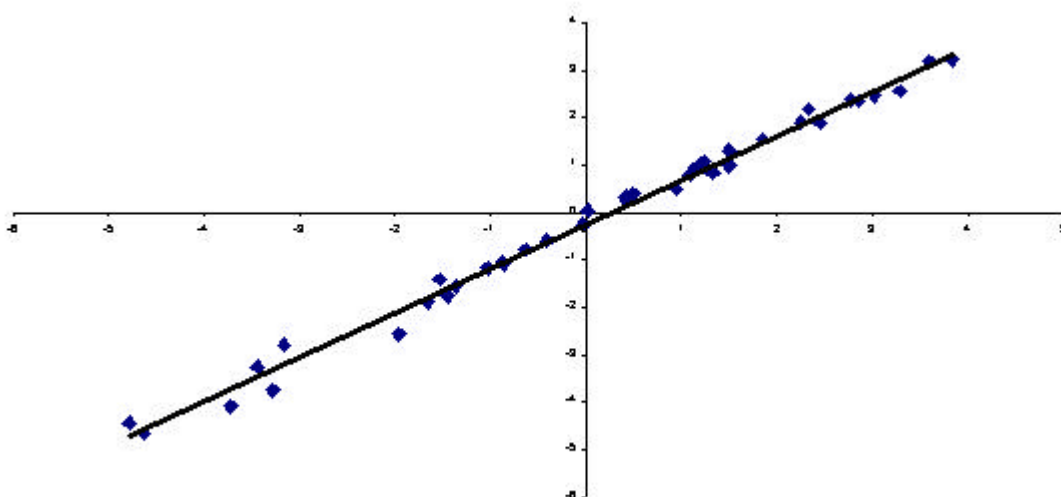


Figure 3: Relationship between student and parent item thresholds.

Figure 4 provides a comparison of the proportion of parents and students in each band.

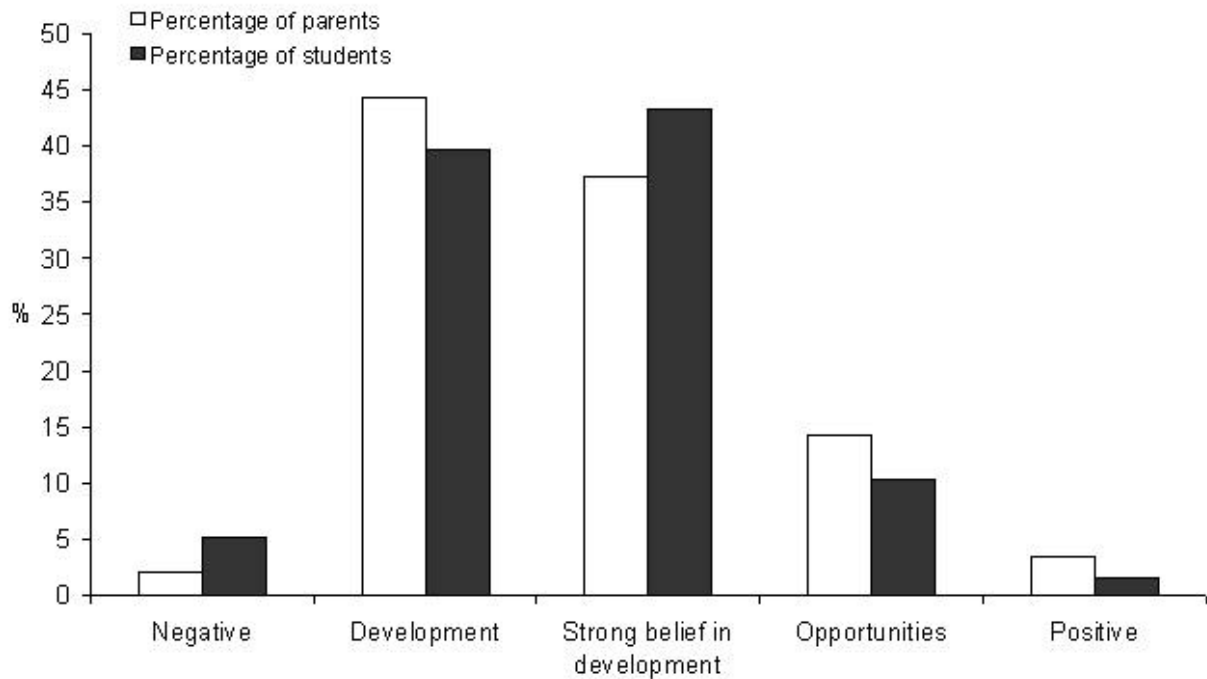


Figure 4. Comparison of parents' attitudes and students' attitudes.

Figure 4 demonstrates that there were similar proportions of parents and students in each band. The similarity in the response to each item and in the percentage of parents and students in each band adds weight to the argument that the two scales constructed are valid.

Implications

Given the important association of the attitudes of parents and students with students' educational outcomes, the scales to measure parent and student attitudes in Vietnam are useful instruments for Vietnamese researchers and international researchers doing research in Vietnam. The process of designing these scales is a useful guide for researchers in designing other instruments, and possibly helps to place the very first step of introducing applied measurement as a new field within educational and social research in Vietnam.

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