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The Reliability and Validity of an Instrument to Evaluate the Implementation of Program i-THINK

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Abstract

In order to assess the execution of a programme known as 'Program i-THINK' in schools, a reliable and valid instrument is required. The research aimed to develop and validate the instrument. The instrument utilised was a questionnaire distributed to 160 primary school teachers. The context, input, process, and product or CIPP Evaluation Model, established by Daniel Stufflebeam, served as the foundation for the instrument. Experts examined the content validity of the instrument, while Exploratory Factor Analysis was utilised to assess the construct validity. Internal consistency reliability, often known as alpha coefficient reliability or Cronbach Alpha, was used to assess the reliability of the instrument. The pilot study findings suggest that the instrument is reliable and valid. Consequently, 98 items were retained out of 133 items.

Keywords: CIPP model, evaluation, exploratory factor analysis, i-THINK programme

1. Introduction

The Malaysian education system has witnessed several changes throughout the decades, each with its own distinct qualities. These changes are necessary to meet the country and global developing needs. Not to be outdone, a big wave of developments is currently underway to improve the Malaysian education sector. Recent educational developments may be interpreted as highlighting healthy human development. The development aligns with the National Education Philosophy enshrined in the Education Act of 1996, which states that "education in Malaysia is a continuous effort to further develop the potential of individuals in a comprehensive and integrated manner in order to produce a balanced and harmonious human being in terms of intellectual, spiritual, emotional, and physical development."

The i-THINK programme is a teaching approach established to inspire students to think and be more focused on topics learned through the use of mind maps as teaching aids (Pardieck, 2011). Each mind map in the i-THINK programme is associated with a particular thinking process related to the topic or unit of study. Additionally, the i-THINK mind map assists pupils in actively expanding their thinking. Indirectly, this strategy enhances the ability and generates innovative and creative human capital capable of high-level thinking, attaining the aspirations of the National Education Philosophy (Muhamad Sidek et al. 2013; Rosnidar Mansor et al. 2015).

The objective of the i-THINK programme is to develop future human capital skilled in creative, critical and innovative thinking and to encourage higher thinking skills and productivity (MOE, 2013a). This programme has recently entered the world market, and Malaysia is the second country to purchase the programme after Ethiopia (Mohammad Sidek et al. 2013). The term 'i-THINK' refers to the letter 'i', which stands for innovation, while "Think" signifies thinking. The i-THINK programme highlights the importance of

innovative thinking among students (BPK, 2012b). Besides, the i-THINK programme prompts students to reason, focus, be confident, foster a friendly teacher-student relationship, be active, enjoy learning, and increase their overall achievement (MOE, 2013a). In the i-THINK programme, mind maps designed by Dr David Hyerle are supporting and thinking tools. The mind maps are presented in eight easily-understood visual mind maps. Each mind map represents a specific thinking process, and its use has been tailored to the title by the Ministry of Education (MOE, 2013a).

2. Aim of This Paper

This study aimed to evaluate the implementation of the i-THINK programme and to identify the validity and reliability of the instrument.

3. Methodology

This study adopted a quantitative research methodology. The survey instrument was a questionnaire with a five-point Likert scale (strongly disagree to strongly agree) distributed to 160 primary school teachers in one of the Malaysian states.

4. The Instrument

The instrument was developed in stages. The researchers started by performing a comprehensive literature search on various theories. Second, the researchers designed the instrument using the features specified by Stufflebeam as this study is based on Stufflebeam's Context, Input, Process, and Product (CIPP) Model. Thirdly, the researchers also referred to past instruments and constructs developed by the ministry in its documents. Finally, an evaluation was conducted with the help of seven field specialists: two evaluation experts, two subject matter experts, one language expert, and two institutional and department representatives. This procedure is primarily utilised to verify the content validity of each questionnaire item. The researchers made corrections and improvements in response to expert comments and suggestions. After completing the final draft, the researchers submitted it to the academic advisor for finalisation before distributing the instrument for the pilot study. A pilot study was conducted to validate the questionnaire via analysis and testing validity and reliability criteria.

5. Results and Discussion

The findings reported in this study are structured around two crucial characteristics, notably the reliability and validity of the instruments. A survey was conducted, and the validity and reliability methods results yielded 102 originality items out of 133 items.

5.1 Reliability and Validity for Context Evaluation

The context evaluation dimension comprises three constructs: teachers' views on the aspirations of the Malaysian Education Ministry, National Education Philosophy and Malaysia education Blueprint (2013–2025). Each construct has three items, thus, a total of nine items for context dimension. As shown in Table 1, Cronbach's Alpha was utilised to measure the internal consistency reliability for each construct. The pilot study findings for the context evaluation dimension found that the reliability value of Cronbach's Alpha is high. For example, the first construct ranged between 0.876 and 0.910. Additionally, the second construct ranged between 0.919 and 0.951, while the third was between 0.882 and 0.887. The findings imply that all items have a minimum value of more than 0.60, indicating that the items are acceptable and have good reliability. Hence, the items in this construct can be used in field studies. Table 1 shows the Cronbach's Alpha values if items are deleted, and the overall Cronbach's Alpha for the context assessment dimension construct.

Table 1. Cronbach's Alpha values if items are deleted and overall Cronbach's Alpha for context assessment dimension constructs

Context Evaluation Constructs	Item	Cronbach's Alpha if Item Deleted	Overall Value Cronbach's Alpha
Teachers' views on Malaysian Education Ministry	B1	0.910	0.932
	B2	0.876	
	B3	0.879	

Teachers' views on National Education Philosophy	B4	0.951	0.952
	B5	0.919	
	B6	0.919	
Teachers' views on MEB (2013-2025)	B7	0.887	0.921

The questionnaire was subjected to an exploratory factor analysis (EFA) analysis in IBM Statistical Package for the Social Sciences (SPSS) utilising principal component analysis (PCA) with the Direct Oblimin rotation. Variance values extracted by factors greater than one were used. Nevertheless, when double loading occurs, meaningful interpretation must be made with caution (Muijs, 2011b). The results from the rotation of the Varimax (Rotated Component Matrix) method using Kaiser Normalisation (Varimax with Kaiser Normalisation) show that the factors from the context evaluation dimension components were extracted. The analysis also revealed that the types of items contributing to the factors are similar to those proposed by the earlier theory. The factor analysis findings using Varimax rotation for the context assessment dimension are shown in Table 2.

Table 2. Factor analysis findings with Varimax rotation for context evaluation dimension components

Component			
Item	**1**	**2**	**3**
B2	0.968		
B6	0.923		
B5	0.920		
B3	0.902		
Component			
Item	**1**	**2**	**3**
B8	0.896		
B4	0.540	0.446	
B7		1.014	
B1		0.672	
B9		0.590	0.440

Based on Table 2, three factors from the context evaluation dimension component were extracted. The factors are: (a) three items from teachers' views on the intentions of the Malaysian Education Ministry (Items B1-B3), (b) teachers' views on National Education Philosophy (Items B4-B5) and (c) teachers' views on MEB (2013–2025) (Items B7-B9), respectively. Nonetheless, items B4 and B9 were found to overlap in two factors, indicating that the items measure two similar constructs. Consequently, the researchers deleted these items from the questionnaire.

5.2 Reliability and Validity for Input Evaluation

The input evaluation dimension comprises three constructs: teachers' views on in-service training in implementing the i-THINK programme, teachers' views on teaching aids in implementing the i-THINK programme, and teachers' views on the physical classroom, as shown in Table 3. The pilot study findings for

the input evaluation dimension found that the value of Cronbach's Alpha is high, namely for the first construct range between 0.957 and 0.962, the second construct range between 0.928 and 0.934, and the third construct range between 0.944 and 0.957. These findings indicate that all items have a minimum value of more than 0.60, indicating acceptable to very good reliability.

Hence, if the researcher is satisfied with the reliability of the instrument, the pilot study is not repeated before administering the instrument to the actual sample (Ghazali Darusalam & Sufean Hussin, 2016). Thus, the items in this construct can be used in field studies. Table 3 shows the Cronbach's Alpha values if the items are eliminated and the overall Cronbach's Alpha for the input evaluation dimension construct.

Table 3. Cronbach's Alpha values if items are deleted, and overall Cronbach's Alpha for the input evaluation dimension construct

Input Evaluation Constructs	Item	Cronbach's Alpha if Item Deleted	Overall Cronbach's Alpha Value
1. Teachers' views on: (a) In-service training (b) Teaching aids (c) Physical classroom	C1	0.962	0.965
	C2	0.957	
	C3	0.957	
	C4	0.957	
	C5	0.957	
	C6	0.960	
Teachers' views on: (b) Teaching aids	C7	0.934	0.948
	C8	0.928	
	C9	0.931	
	C10	0.930	
	C11	0.958	
Teachers' views on: (c) Physical classroom	C12	0.956	0.961
	C13	0.950	
	C14	0.944	
	C15	0.949	
	C16	0.957	

Based on Table 4, three factors from the input evaluation dimension components were extracted. The factors are: (a) teachers' views on in-service training in the implementation of the i-THINK programme (Items C1-C6) including six items, (b) teachers' views on teaching aids in the implementation of the i-THINK programme (Items C7-C11) involving five items, and (c) teachers' views on the physical classroom (Items C12-C16) comprising five items. Nevertheless, item C6 was found to overlap in two factors, indicating that it measures two similar constructs. Hence, the researchers deleted C6 from the questionnaire.

Table 4. Results of Varimax rotation factor analysis for input evaluation dimension components

Component			
	1	**2**	**3**
C4	0.907		
C3	0.905		
C1	0.868		
C5	0.852		
C2	0.838		
C6	0.599		-0.407

C14		0.979	
C15		0.939	
C13		0.88	
C16		0.866	
Component			
	1	**2**	**3**
C12		0.827	
C10			-0.849
C11			-0.834
C9			-0.743
C8			-0.733
C7			-0.665

5.3 Reliability and Validity for Process Evaluation

The process evaluation dimension consists of six constructs, namely: teachers' knowledge of the i-THINK programme, teachers' attitudes in implementing the i-THINK programme in the classroom, adequacy of training for teachers in implementing the i-THINK programme, application frequency of the i-THINK programme implementation in teaching, relationships between students and teachers during the programme implementation and cooperation of administrators in the programme implementation. As shown in Table 5, Cronbach's Alpha was utilised to provide a reliability measure for the internal consistency of each construct. The findings of the pilot study for the process evaluation dimension found that Cronbach's Alpha value was high, namely 0.985 to 0.986 for the first construct, 0.978 and 0.979 for the second construct, 0.986 to 0.987 for the third construct, 0.926 to 0.937 for the fourth construct, 0.969 to 0.972 for the fifth construct, and 0.965 to 0.968 for the sixth construct.

The findings indicate that all items have a minimum value of more than 0.60, indicating acceptable to very good reliability. Therefore, if the researcher is satisfied with the reliability of the instrument, the pilot study is not repeated before administering the instrument to the actual sample. Hence, the items in this construct can be used in field studies. Table 5 displays the overall Cronbach's Alpha for the process assessment dimension construct and the value of Cronbach's Alpha if the items are removed.

Table 5. Cronbach's Alpha values if items are eliminated and overall Cronbach's Alpha for process evaluation dimension constructs

Process Evaluation Constructs	Item	Cronbach's Alpha if Item Deleted	Overall Cronbach's Alpha Value
Teachers' knowledge of the i-THINK programme	D1	0.985	0.986
	D2	0.985	
	D3	0.985	
	D4	0.985	
	D5	0.985	
	D6	0.985	
	D7	0.985	
	D8	0.985	
Process Evaluation Constructs	Item	Cronbach's Alpha if Item Deleted	Overall Cronbach's Alpha Value
	D9	0.986	
	D10	0.985	
	D11	0.985	
	D12	0.985	
	D13	0.985	

	D14	0.985	
	D15	0.985	
	D16	0.985	
	D17	0.985	
	D18	0.985	
	D19	0.985	
	D20	0.985	
	D21	0.985	
	D22	0.985	
	D23	0.985	
	D24	0.985	
The attitude of teachers in implementing the i-THINK programme in the classroom	D25	0.978	0.98
	D26	0.979	
	D27	0.979	
	D28	0.978	
	D29	0.978	
	D30	0.978	
	D31	0.978	
	D32	0.978	
	D33	0.978	
	D34	0.979	
	D35	0.979	
	D36	0.978	
	D37	0.978	
	D38	0.978	
Adequacy of training for teachers in implementing the i-THINK programme	D39	0.986	0.987
	D40	0.986	
	D41	0.986	
	D42	0.986	
	D43	0.986	
	D44	0.986	
	D45	0.986	
	D46	0.986	
	D47	0.986	
	D48	0.986	
	D49	0.986	
	D50	0.986	
	D51	0.986	
	D52	0.986	

Process Evaluation Constructs	Item	Cronbach's Alpha if Item Deleted	Overall Cronbach's Alpha Value
	D53	0.986	
	D54	0.987	
	D55	0.986	
	D56	0.927	0.941

Frequency of application of i-THINK programme implementation in teaching and learning	D57	0.926	
	D58	0.931	
	D59	0.935	
	D60	0.937	
	D61	0.937	
	D62	0.927	
Student-teacher relationship during the implementation of the i-THINK programme	D63	0.970	0.973
	D64	0.970	
	D65	0.971	
	D66	0.969	
	D67	0.968	
	D68	0.969	
	D69	0.969	
	D70	0.972	
	D71	0.970	
	D72	0.971	
Cooperation of administrators in the implementation of the i-THINK programme	D73	0.967	0.970
	D74	0.967	
	D75	0.966	
	D76	0.966	
	D77	0.967	
	D78	0.965	
	D79	0.966	
	D80	0.968	
	D81	0.967	
	D82	0.967	

Based on Table 6, six factors from the process evaluation dimension components were extracted. The factors are:

(a) Teacher's knowledge of the i-THINK programme (24 Items: Items D1-D24)

(b) Teachers' attitude in implementing the i-THINK programme (14 Items: D25-D38)

(c) Adequacy of training for teachers in implementing the i-THINK programme (17 Items: D39-D55)

(d) Frequency of application of the implementation of the i-THINK programme in teaching and learning (Seven Items: D56-D62)

(e) Student relationship with teachers during the implementation of the i-THINK programme (Ten Items: D63-D72)

(f) Cooperation of administrators in the implementation of the i-THINK programme (Ten Items: D73-D82)

Nevertheless, items D36, D20, D23, D21, D19, D70, D67, D64, D60, D71, D14, D13, D12, D17, D66, D16, D72 and D68 were found to overlap in two factors indicating that the items measure two similar constructs. In comparison, while for item D15, it was found to overlap in three factors indicating that it measures three similar constructs overlap in three factors, indicating it measures three identical constructs. Thus, the researchers deleted items D36, D20, D23, D21, D19, D70, D67, D64, D60, D71, D14, D13, D12, D17, D66, D16, D72, D68 and D15 mentioned in the questionnaire. Meanwhile, values factor loading for items D1, D18, D22, D24, D61, D63, D69 and D11 that were less than 0.50. The researcher deleted items D1, D18, D61, D63, D69, and D11 from questionnaire.

Table 6. Factor results with Varimax rotation for process evaluation dimension components

Component						
	1	**2**	**3**	**4**	**5**	**6**
D30	0.797					
D29	0.717					
D32	0.715					
D33	0.705					
D35	0.704					
D34	0.697					
D26	0.679					
D25	0.671					
D31	0.65					
D27	0.626					
D36	0.609		-0.325			
D28	0.604					
D37	0.603					
D38	0.595					
D22	0.466					
D20	0.459				0.397	
D24	0.458					
D23	0.457				0.333	
D21	0.451				0.41	
D19	0.434				0.347	
D70	0.346					-0.324
D78		0.93				
D77		0.929				
D79		0.877				
D76		0.864				
D75		0.861				
D82		0.809				
Component						
	1	**2**	**3**	**4**	**5**	**6**
D80		0.801				
D81		0.776				
D74		0.771				
D73		0.751				
D49			-0.872			
D47			-0.868			
D50			-0.856			
D48			-0.83			
D45			-0.816			
D44			-0.811			
D46			-0.806			
D43			-0.775			
D41			-0.732			

D39			-0.716			
D51			-0.715			
D53			-0.685			
D40			-0.653			
D52			-0.64			
D55			-0.638			
D42			-0.6			
D54			-0.535			
D59				0.869		
D58				0.857		
D57				0.731		
D56				0.606		
D62				0.581		
D65				0.526		
D67				0.516		-0.318
D61				0.495		
D63				0.491		
D69				0.469		
D64				0.443		-0.362
D60				0.421	0.375	
D71	0.345			0.379		
D8					0.79	
D6					0.789	
D7					0.762	
D3					0.719	
D9					0.686	
D4					0.665	
D5					0.647	
D2					0.606	
D10					0.473	
D14			-0.425		0.459	
Component						
	1	**2**	**3**	**4**	**5**	**6**
D11					0.422	
D13			-0.314		0.4	
D12			-0.316		0.394	
D18					0.365	
D1					0.361	
D17					0.329	0.305
D66				0.307		-0.435
D16			-0.377			0.417
D72				0.308		-0.406
D15			-0.343	0.346		0.377
D68				0.315		-0.366

5.4 Validity and Reliability for the Product Evaluation Dimension

The process evaluation dimension consists of four constructs, namely students' knowledge of the i-THINK programme mind map, students' attitude towards the i-THINK programme, students' skills on the i-THINK programme mind map, and improving students' achievement after applying the i-THINK programme mind map. Cronbach's Alpha was utilised to measure the internal consistency of the reliability of each construct, as shown in Table 7. The pilot study findings for the product evaluation dimension found that the value of Cronbach's Alpha is high. The first construct was between 0.936 and 0.946, whereas the second construct was between 0.952 and 0.956. The third construct was between 0.945 and 0.953, whereas the fourth construct was between 0.972 and 0.973.

The findings indicate that all items have a minimum value of more than 0.60, indicating acceptable to very good reliability. Resultantly, if the researcher is satisfied with the reliability of the instrument, the pilot study does not have to be repeated before administering the instrument to the actual sample. Hence, the items in this construct can be used in the field study. Table 7 shows the Cronbach's Alpha values if the items are eliminated and the overall Cronbach's Alpha for the product evaluation dimension construct.

Table 7. Cronbach's Alpha values if items are eliminated, and overall Cronbach's Alpha for the product evaluation dimension construct

Product Evaluation Constructs	Item	Cronbach's Alpha if Item Deleted	Overall Cronbach's Alpha Value
Pupils' knowledge of i-THINK mind map	E1	0.944	0.954
	E2	0.946	
	E3	0.936	
	E4	0.945	
	E5	0.945	
Students' attitudes towards the i-THINK programme	E6	0.956	0.961
	E7	0.952	
	E8	0.953	
	E9	0.952	
	E10	0.954	
	E11	0.955	
Students' skills on the i-THINK programme mind map	E12	0.953	0.957
	E13	0.945	
	E14	0.948	
	E15	0.948	
	E16	0.947	
	E17	0.951	
Improving student achievement after applying the i-THINK programme mind map	E18	0.973	0.976
	E19	0.972	
	E20	0.973	
	E21	0.972	
	E22	0.973	
	E23	0.972	
	E24	0.973	
	E25	0.973	
	E26	0.973	

The results of the Varimax (Rotated Component Matrix) method matrix rotation using normality (Varimax with Kaiser Normalisation) showed four factors from the extracted product components. Table 8 shows the factor results with Varimax rotation for the product evaluation dimension component.

Table 8. Factor results with Varimax rotation for product evaluation dimension components

Item	Component			
	1	2	3	4
E19	0.903			
E20	0.901			
E22	0.9			
E23	0.9			
E18	0.899			
E10	0.898			
E8	0.897			
E17	0.896			
E26	0.895			
E9	0.894			
E11	0.893			
E21	0.892			
E7	0.892			
E25	0.889			
E24	0.884			
E1	0.879			
E4	0.875			
E3	0.869	-0.312		
E5	0.865			
E6	0.864			
E13	0.863	0.349		
E16	0.86			
E2	0.859			
E15	0.85	0.322		
E14	0.85	0.306		
E12	0.792	0.381		

Based on Table 8, four factors from the product evaluation dimension components were extracted. The factors are (a) students' knowledge of the i-THINK programme mind map (Items E1-E5), which includes five items, (b) students' attitude in implementing the i-THINK programme (Items E6-E11) comprising six items, (c) students' skills on the i-THINK programme mind map (Items E12-E17) involving six items and (d) improvement of student achievement after applying the i-THINK programme mind map (Items E18-E26) consisting of nine items. Nevertheless, items E3, E13, E15, E14, and E12, were found to overlap in two factors, indicating that the items measure two similar constructs. Resultantly, the researchers deleted the items E3, E13, E15, E14, and E12 from the questionnaire. Table 9 shows all items in CIPP evaluation dimensions and items after the validity and reliability process.

Table 9. All items on context, input, process and product evaluation constructs

Context evaluation construct	**Items before the validity and reliability context**	**Item after the validity and reliability context**
1. Teachers' views on (a) Malaysian Education Ministry	B1, B2, B3	B1, B2, B3
(b) National Education Philosophy	B4, B5, B6	B5, B6
(c) MEB 2013-2025	B7, B8, B9	B7, B8
Input evaluation construct	**Items before the validity and reliability input**	**Item after the validity and reliability input**
2. Teachers' views on: (a) In-service training	C1, C2, C3, C4, C5, C6	C1, C2, C3, C4, C5
(b) Teaching aids	C7, C8, C9, C10, C11	C7, C8, C9, C10, C11
(c) Physical classroom	C12, C13, C14, C15, C16	C12, C13, C14, C15, C16
Process evaluation construct	**Items before the validity and reliability process**	**Item after the validity and reliability process**
3. (a) Teachers' knowledge of the i-THINK programme	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14, D15, D16, D17, D18, D19, D20, D21, D22, D23, D24	D2, D3, D4, D5, D6, D7, D8, D9, D10
(b) The attitude of teachers in implementing the i-THINK programme in the classroom	D25, D26, D27, D28, D29, D30, D31, D32, D33, D34, D35, D36, D37, D38	D25, D26, D27, D28, D29, D30, D31, D32, D33, D34, D35, D37, D38
(c) Adequacy of training for teachers in implementing the i-THINK programme	D39, D40, D41, D42, D43, D44, D45, D46, D47, D48, D49, D50, D51, D52, D53, D54, D55	D39, D40, D41, D42, D43, D44, D45, D46, D47, D48, D49, D50, D51, D52, D53, D54, D55
(d) Frequency of application of i-THINK programme implementation in teaching and learning.	D56, D57, D58, D59, D60, D61, D62	D56, D57, D58, D59, D62
(e) Student-teacher relationship during the implementation of the i-THINK programme	D63, D64, D65, D66, D67, D68, D69, D70, D71, D72	D65
(f) Cooperation of administrators in the implementation of the i-THINK programme	D73, D74, D75, D76, D77, D78, D79, D80, D81, D82	D73, D74, D75, D76, D77, D78, D79, D80, D81, D82
Product evaluation construct	**Items before the validity and reliability product**	**Item after the validity and reliability product**
4. (a) Teachers' knowledge of the i-THINK programme	E1, E2, E3, E4, E5	E1, E2, E4, E5
Product evaluation construct	**Items before the validity and reliability product**	**Item after the validity and reliability product**
(b) Students' attitudes towards the i-THINK programme	E6, E7, E8, E9, E10, E11	E6, E7, E8, E9, E10, E11

(c) Students' skills on the i-THINK programme mind map	E12, E13, E14, E15, E16, E17,	E16, E17
(d) Improving student achievement after applying the i-THINK programme mind map	E18, E19, E20, E21, E22, E23, E24, E25, E26	E18, E19, E20, E21, E22, E23, E24, E25, E26
TOTAL ITEMS	133	98

8. Discussion

Evaluation is an essential part of education. The combination of evaluation, curriculum, and instruction is critical for improving the learning and teaching process in the classroom. One of the primary components of this initiative is the i-THINK programme. Presently, limited tools are in place to assess the implementation of the i-THINK programme. Resultantly, an instrument to assess instructors' perceptions of i-THINK programme implementation has been designed and tested. According to the study, displaying the reliability and validity value of a questionnaire is critical in allowing fellow researchers to have confidence in the quality of the data they collect afterwards. The instrument was created using literature reviews and previous instruments from the i-THINK programme. Cronbach Alpha was determined to be between 0.882 and 0.986 in this study. The value is considered acceptable because for a test to be internally consistent, the value must be more than 0.7. Besides. Zainuddin (2012) is a sample size of 100 people is a construction factor of 0.55 and above is significant. Steven (2012) also set it for a sample of 100 people, and set a larger load factor based on 0.512. Furthermore, the factor loading value is relatively high, providing vital information on construct validity. Nevertheless, the researchers' relevant interpretations were also assessed.

9. Conclusion

This research aimed to provide a framework for evaluating the i-THINK programme in Malaysia. Specific components have been acknowledged to be mainly directed towards teachers, while the overall perception by students will be harder to identify. Furthermore, the effectiveness of the suggested framework depends on the quality of the study conducted. In order to obtain more relevant formative and summative evaluations, perspectives from diverse samples are critically, particularly from administration groups, headteachers, ministry officers and students. Moreover, investing in the teachers' professional development with minimal effect on the growth of pupils may not help students improve their skills.

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