

## ORIGINAL ARTICLE

# The Verification of the Reliability and Validity of Inclusive Education Assessment Tool (IEAT)

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## ABSTRACT

Han, Yano & Yonemizu (2015) also developed the Inclusive Education Assessment Tool(IEAT) to understand the establishment of inclusive education system. This tool was developed based on the understanding of the current state of inclusive education and the relationship between inclusive education and special needs education in Japan. IEAT is the first tool to evaluate the current state of inclusive education system, but its reliability and validity have not been verified yet. Therefore, this study aimed to verify the reliability, content validity and construct validity of IEAT. Content Validity; When over 80 percent of the respondents answered that the tool is valid, it is determined that this tool is verified to be valid. Reliability; Reliability of IEAT was estimated using the internal consistency method. The internal consistency of IEAT was assessed with Cronbach's  $\alpha$ . A minimum Cronbach's  $\alpha$  co-efficient of 0.7 was considered satisfactory for group-level comparisons. Construct Validity; Construct validity was verified using structural equation modeling (SEM). Goodness of fit index (GFI), comparative fit index (CFI) and root mean square error of approximation (RMSEA) are the suitability indices of SEM; researchers may choose which index they would use for the verification of SEM. A model is considered acceptable, when two or more fit indices are met including RMSEA. For adequately fitting models, these fit indices should meet the following criteria: GFI>0.95, CFI>0.90 and RMSEA<0.1. As the result, Over 90 percents of respondents answered that this tool is valid in all the items and domains, guarantee of rights( $\alpha=0.848$ ), improvement in environment( $\alpha=0.752$ ) and reform in curriculum( $\alpha=0.775$ ); GFI=0.953; CFI=0.952; and RMSEA=0.068. The validity was verified because the values of GFI, CFI and RMSEA were within the goodness-of-fit range.

< Key-words >

Inclusive education, IEAT, Verification of the Reliability and Validity,

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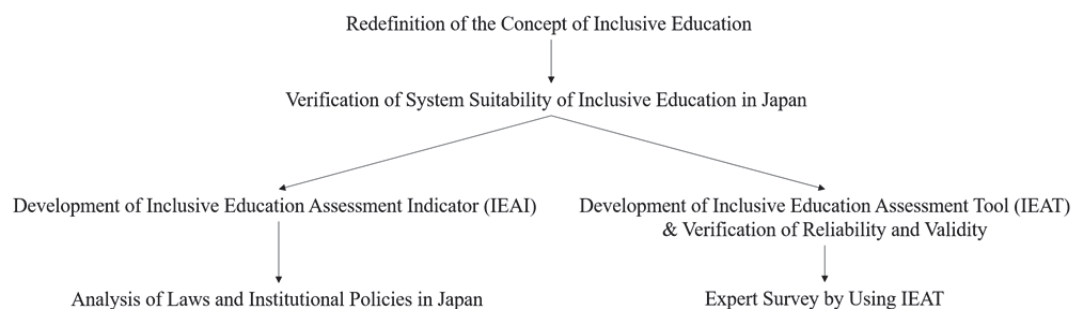
## I . Introduction

Including Japan, inclusive education became the world-wide issue in the field of educational policy. In Japan, however, even though the policies for the implementation of inclusive education system have been prepared, but there is no tool to evaluate the level of inclusive education yet (Kohara, Yano& Han, 2014).

For the evaluation of inclusive education system, the study on the philosophy and theoretical background of inclusive education has been conducted, Inclusive Education Assessment Indicator (IEAI) that evaluates the inclusive education system and policies was developed and the study on the analysis of the laws, systems and policies on education in Japan by using IEAI was carried out (Figure1). Han, Yano& Yonemizu(2015) also developed the Inclusive Education Assessment Tool(IEAT) to understand the establishment of inclusive education system. This tool was developed based on the understanding of the current state of inclusive education and the relationship between inclusive education and special needs education in Japan.

IEAT intended to understand the state of inclusive education system through the subjective evaluation of the educational experts. IEAT consists of 11 items of three domains; the guarantee of rights, the improvement in environment and the reform in curriculum (Figure 2). IEAT is the first tool to evaluate the current state of inclusive education system, but its reliability and validity have not been verified yet.

Therefore, this study aimed to verify the reliability, content validity and construct validity of IEAT.



<Figure 1> The Research Process on the Evaluation of Inclusive Education System

### Inclusive Education Assessment Tool (IEAT)

【How to answer the questions and calculate the scores】

- ① Please check the (○) corresponding to the answer that you think is most appropriate for each question between Q1 and Q11.
- ② Please add the scores of each domain and check the (○) corresponding to the level of the score of each domain between Level I and Level V.

#### ① Guarantee of Rights

		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Q1	Has the right to education been guaranteed?	5	4	3	2	1
Q2	Has the extracurricular activities been guaranteed?	5	4	3	2	1
Q3	Has the equal opportunity been secured?	5	4	3	2	1
<b>① Subtotal of the Guarantee of Rights</b>		<b>/ 15</b>				
		<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>	<b>V</b>
		3~5	6~8	9~11	12~14	15

#### ② Improvement in Environment

Q4	Have the efforts been taken to improve the learning environment?	5	4	3	2	1
Q5	Have the efforts been taken to improve the expertise of teachers?	5	4	3	2	1
Q6	Have the opportunities for inclusive learning been provided (room, facilities and environment for inclusive learning)?	5	4	3	2	1
Q7	Have the network among various professionals (or organizations) such as health, medicine, welfare and labor and among parents been formed and operated?	5	4	3	2	1
<b>② Subtotal of the Improvement of Environment</b>		<b>/ 20</b>				
		<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>	<b>V</b>
		4~7	8~11	12~15	16~19	20

#### ③ Reform in Curriculum

Q8	Have the efforts to improve the independence of students been taken?	5	4	3	2	1
Q9	Have the efforts for the participation of community in the inclusive education been taken?	5	4	3	2	1
Q10	Have the efforts to promote the awareness of disabilities been taken?	5	4	3	2	1
Q11	Have the efforts for the cultivation of the leaders who work for inclusive society been taken?	5	4	3	2	1
<b>③ Subtotal of the Reform in Curriculum</b>		<b>/ 20</b>				
		<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>	<b>V</b>
		4~7	8~11	12~15	16~19	20

<b>Calculation</b>	Please add the scores of each domain and check the (○) corresponding to the level of the score of each domain between Level I and Level V.	Each answer of questions can be changed to the corresponding score; strongly agree = 5, agree = 4, neutral = 3, disagree = 2 and agree = 1.
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<Figure 2> Inclusive Education Assessment Tool: IEAT

## II. Methods

### 1. Subject& Procedure

In the workshop for inclusive education by the Okinawa Prefectural Board of Education, the survey on IEAT was carried out; the consent to participate in the survey was gained after explaining the purposes and contents of the study and the questionnaires were distributed. In the workshop, the public officers from Okinawa Prefectural Board of Education and Education Offices (the branches of prefectural board of education) and special needs education coordinators from elementary, middle and high schools within the Prefecture participated in the workshop.

The seven workshops were held between November, 2014 and September, 2015. 62 public officials for education and 590 special needs education coordinators (total 652) responded to the survey; all the public officials for education held teacher's license. Special needs education coordinators are the teachers who play the central role of special needs education in each school and their main responsibility is to manage the network of diverse people and organizations including administrative officers, families, educational institutions such as elementary schools, middle schools, high schools, etc. and organizations related with the education for persons with disabilities such as hospitals, welfare facilities and organizations related with employment.

### 2. Questionnaire

#### 1) Face Sheet

On the face sheet of IEAT was distributed to the respondents (evaluators), the information on the respondents were asked; age, gender, the period of working as a teacher, the period of working at special needs school, the period of working at the special needs classes, the period of working as a special needs education coordinator, the period of working at the board of education and whether to hold the teacher's license for special needs education.

#### 2) Content Validity of IEAT

The content validity of IEAT of 11 questions of three domains were verified by using five-point scale; the score of 5=very valid, 4=valid, 3=limitedly valid, 2=in-valid and 1=very in-valid.

#### 3) IEAT

IEAT is the tool for understanding the state of inclusive education system. IEAT consists of 11 items of three domains; the guarantee of rights, the improvement in environment and the reform in curriculum. For each item, the evaluators are asked to indicate the extent of their agreement or disagreement using a five-point scale; the score of 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree.

### 3. Statistical Analysis

#### 1) Content Validity

Content validity is largely stated whether it is valid or in-valid; 5 = very valid, 4 = valid and 3 = limitedly valid are considered as valid and 2 = in-valid and 1 = very in-valid are considered as in-valid. When over 80 percent of the respondents answered that the tool is valid, it is determined that this tool is verified to be valid (Usuta, 2000; Toyama, 2013).

#### 2) Reliability of IEAT

Reliability of IEAT was estimated using the internal consistency method. The internal consistency of IEAT was assessed with Cronbach's  $\alpha$ . A minimum Cronbach's  $\alpha$  coefficient of 0.7 was considered satisfactory for group-level comparisons (Cronbach, 1951).

#### 3) Construct Validity

Construct validity was verified using structural equation modeling (SEM). Goodness of fit index (GFI), comparative fit index (CFI) and root mean square error of approximation (RMSEA) are the suitability indices of SEM; researchers may choose which index they would use for the verification of SEM.

A model is considered acceptable, when two or more fit indices are met including RMSEA (Steiger, 1998). For adequately fitting models, these fit indices should meet the following criteria: GFI>0.95 (Shevlin & Miles, 1998), CFI>0.90 (Han, Lee, Iwaya, Kataoka & Kohzuki, 2005) and RMSEA<0.1 (Koshio, 2004). In this research, maximum likelihood estimation was used for the parameter estimation. AMOS ver.4.0 was employed for statistical analysis.

## III. Result

### 1. Content validity of the IEAT

The characteristics of respondents are shown in the Table 1. Over 90 percents of respondents answered that this tool is valid in all the items and domains (Table 2).

<Table1> Characteristics of the Respondents to the Content Validity of IEAT (N=410)

Characteristics	M $\pm$ SD
Age	42.2 $\pm$ 10.0
Period of teaching experiences	17.2 $\pm$ 9.9
Period of teaching experiences at special needs school(s)	1.71 $\pm$ 5.3
Period of teaching experiences at special needs classroom(s)	1.6 $\pm$ 3.3
Period of working as a special needs education coordinator	1.7 $\pm$ 2.3
Period of experiences in board of education	0.3 $\pm$ 1.9
Gender	Male: 77(18.8%) Female: 332 (81.0%) No response: 1 (0.2%)
Teacher's license for special needs education	With license: 136 (33.2%) Without license: 274 (66.8%)

&lt;Table.2&gt; The Results of the Survey on the Validity of Each Domain and Question Item (N=410)

	Questions	Valid N(%)			In-valid N(%)		No-response N(%)
		Very valid N(%)	Valid N(%)	Limitedly Valid N(%)	In-valid N(%)	Very In-valid N(%)	
Domain 1	The inclusion of the scope of "Guarantee of rights" in the IEAT	402(98.0)			0(0.0)		8(1.9)
		174(42.4)	195(47.5)	33(8.0)	0(0.0)	0(0.0)	
Domain 2	The inclusion of the scope of "Improvement in environment" in the IEAT	402(98.0)			0(0.0)		8(1.9)
		243(59.2)	144(35.1)	15(3.6)	0(0.0)	0(0.0)	
Domain 3	The inclusion of the scope of "Reform in curriculum" in the IEAT	400(97.5)			1(0.2)		9(2.1)
		171(41.7)	198(48.2)	31(7.5)	1(0.2)	1(0.2)	
Item 1	The inclusion of Q1 in "Guarantee of rights" of the IEAT	392(95.6)			0(0.0)		18(4.3)
		176(42.9)	185(45.1)	31(7.5)	0(0.0)	0(0.0)	
Item 2	The inclusion of Q2 in "Guarantee of rights" of the IEAT	390(95.1)			1(0.2)		19(4.6)
		148(36.0)	198(48.2)	44(10.7)	1(0.2)	1(0.2)	
Item 3	The inclusion of Q3 in "Guarantee of rights" of the IEAT	390(95.1)			0(0.0)		20(4.8)
		174(42.4)	184(44.8)	32(7.8)	0(0.0)	0(0.0)	
Item 4	The inclusion of Q4 in "Improvement in environment" of the IEAT	389(94.8)			0(0.0)		21(5.1)
		208(50.7)	159(38.7)	22(5.3)	0(0.0)	0(0.0)	
Item 5	The inclusion of Q5 in "Improvement in environment" of the IEAT	389(94.8)			0(0.0)		21(5.1)
		198(48.2)	173(42.1)	18(4.3)	0(0.0)	0(0.0)	
Item 6	The inclusion of Q6 in "Improvement in environment" of the IEAT	388(94.6)			0(0.0)		22(5.3)
		174(44.9)	180(44.4)	34(8.0)	0(0.0)	0(0.0)	
Item 7	The inclusion of Q7 in "Improvement in environment" of the IEAT	388(94.6)			0(0.0)		22(5.3)
		172(41.9)	185(45.1)	31(7.5)	0(0.0)	0(0.0)	
Item 8	The inclusion of Q8 in "Reform in curriculum" of the IEAT	382(93.1)			1(0.2)		27(6.5)
		156(38.0)	180(43.9)	46(11.2)	1(0.2)	1(0.2)	
Item 9	The inclusion of Q9 in "Reform in curriculum" of the IEAT	379(92.4)			3(0.7)		28(6.8)
		133(32.4)	195(47.5)	51(12.4)	3(0.7)	3(0.7)	
Item 10	The inclusion of Q10 in "Reform in curriculum" of the IEAT	381(92.9)			1(0.3)		28(6.8)
		160(39.0)	183(44.6)	38(9.2)	1(0.3)	1(0.3)	
Item 11	The inclusion of Q11 in "Reform in curriculum" of the IEAT	363(94.9)			3(0.7)		28(6.8)
		144(35.1)	184(44.8)	51(12.4)	3(0.7)	3(0.7)	

## 2 Reliability & Construct Validity of the IEAT

### 1) Characteristics of the Respondents to Reliability & Construct Validity of the IEAT

A total of 614 accomplished questionnaires were collected among the 652 that had been distributed (the response rate of 94.1 percent), but of these, only 605 questionnaires could be analyzed because of the incomplete responses of the others. The characteristics of the respondents using IEAT are shown in Table 3. The average length of the period of teaching experiences of respondents (evaluators) was 12.9 years. In addition, 72.7 percent of the teachers had the teacher's license for special needs education.

<Table3> Characteristics of all respondents (N=605)

Characteristics	M ± SD
Age	42.0 ±12.8
Period of teaching experiences	18.6 ±9.9
Period of teaching experiences at special needs school(s)	1.8 ±5.6
Period of teaching experiences at special needs classroom(s)	1.9 ±3.7
Period of working as a special needs education coordinator	2.1 ±2.5
Period of experiences in board of education	0.2 ±1.6
Gender	Male: 97 (16.0%) Female: 506 (83.6%) No response: 2 (0.4%)
Teacher's license for special needs education	With license: 216 (35.7%) Without license: 389 (64.3%)

### 2) Reliability of the IEAT.

The results of the internal consistency (Cronbach  $\alpha$  Coefficient) are as follows: guarantee of rights( $\alpha = 0.848$ ), improvement in environment( $\alpha = 0.752$ ) and reform in curriculum( $\alpha = 0.775$ ) (Table 4).

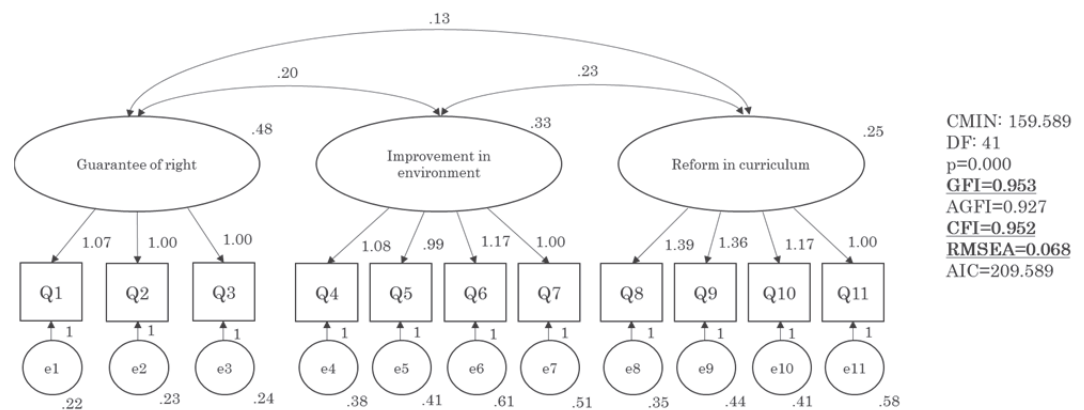
<Table4> IEAT Scale Scores and Reliability Scores (N=605)

Constructs	Mean	SD	Cronbach's alpha if item deleted	Cronbach's alpha
Guarantee of rights				0.848
Q1	4.04	0.76	0.804	
Q2	3.85	0.84	0.780	
Q3	3.85	0.85	0.780	
Improvement in environment				0.752
Q4	3.29	0.87	0.673	
Q5	3.05	0.85	0.691	
Q6	3.34	1.03	0.708	
Q7	3.10	0.91	0.708	
Reform in curriculum				0.775
Q8	3.19	0.91	0.709	
Q9	2.76	0.95	0.692	
Q10	2.94	0.87	0.716	
Q11	2.07	0.91	0.761	

Q1-Q11, (1=minimum, 5=maximum)  $\alpha > .700$

### 3. Validity of the IEAT

As for the SEM, IEAT showed a high level of fitness: GFI=0.953; CFI=0.952; and RMSEA=0.068. The validity was verified because the values of GFI, CFI and RMSEA were within the goodness-of-fit range (Figure3).



<Figure 3> SEM of IEAT

## IV. Discussion

This study verified the reliability and validity of IEAT to understand the current state of inclusive education system for the first time in Japan. In results of verifying the content validity, over 90 percent of respondents answered that IEAT is valid in all the domains and items; therefore, it is confirmed that IEAT has the content validity. In results of measuring the value of Cronbach's  $\alpha$ , high values of Cronbach's  $\alpha$  were shown in all the domains. There was no item to be deleted, because the values of Cronbach's  $\alpha$  if item deleted of each item were below the value of Cronbach's  $\alpha$  of the domain that each item belong to. High values were shown in all the suitability indices of Structural equation modeling (SEM) to verify the construct validity.

In the process of the development of IEAT, theoretical method was also employed. Theoretical method refers to the process of statistically analyzing and arranging the question items that have been made based on the logical examination of the subjects to be measured (Murakami, 2008). The study on the evaluation of inclusive education system commenced with the research on the analysis and arrangement of the concepts of inclusive education in Japan and abroad. Based on those processes, the Inclusive Education Assessment Indicator (IEAI) was developed to analyze the system and policies for inclusive education system and Han, Yano, Kohara, et al. (2015) analyzed the laws, system and policies that are related with education in Japan with the IEAI. Through the abovementioned theoretically suitable process of the development of a tool, the Inclusive Education Assessment Tool (IEAT) was finally developed.

The evaluation of educational system needs to be implemented by the experts who



have the expertise of the system. Therefore, the survey for this study was conducted for the public officers for education from Okinawa Prefectural Board of Education and Education Offices (the branches of prefectural board of education) and special needs education coordinators from elementary, middle and high schools within the Prefecture participated in the workshop. All the public officers for education hold teacher's license and are in charge of educational administration in the region. Special needs education coordinators play the central role for the special needs education in each school and community. Because this study was carried out for all the public officers for education and special needs education coordinators and over 600 of them participated in the survey for this study, high levels of the reliability and validity could be obtained.

It is expected that the IEAT will be prevalently used for the implementation of inclusive education system in Japan, because the IEAT is the only tool that has been verified as a tool to evaluate the inclusive education system until now with high levels of reliability and validity.

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