



The Australian Journal of **INDIGENOUS EDUCATION**

This article was originally published in printed form. The journal began in 1973 and was titled *The Aboriginal Child at School*. In 1996 the journal was transformed to an internationally peer-reviewed publication and renamed *The Australian Journal of Indigenous Education*.

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a STUDY on the INTELLIGENCE PROFILES of TAIWAN INDIGENOUS STUDENTS: The CASE of SECOND GRADE PUPILS

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■ Abstract

This paper attempts to develop an intelligence-fair assessment tool to explore the intelligence profiles of 15 second grade Amis pupils. This study was conducted in an elementary school in Taiwan with a largely Amis population of lower socioeconomic status. The results illustrate that the most developed intelligence for eight pupils was musical intelligence and that most pupils in this class are also skilled at bodily-kinesthetic and linguistic intelligence. However, these second grade pupils did not have very highly developed interpersonal intelligences which traditionally stereotyped the capabilities of indigenous pupils. Furthermore, each student had his/her own unique intelligence profile. Do Amis pupils have a particular intelligence profile as a group? Or are their individual differences greater than their group similarities? It is recommended that future studies observe both the whole ethnic group and individual pupil's intelligence profile to help each pupil develop to their full potential.

■ Introduction

Multiple intelligences (MI) theory would benefit indigenous pupils a great deal if the strengths of their intelligence can be identified. There are more than 490,000 indigenous people in Taiwan, about 2% of the total population. Currently, 14 tribes have been recognised by the government. They are the Amis, Atayal, Paiwan, Bunun, Puyuma, Rukai, Tsou, Saisiyat, Yami, Thao, Kavalan, Truku, Sakizaya, and Sediq, each with their own distinct language, cultural features, traditional customs and social structure. The Amis, with a population of 177,000, is the largest of all of Taiwan's indigenous groups. They are mainly plains dwellers, living in the valleys and coastal plains of eastern Taiwan, the Hualien-Taitung area (Council of Indigenous Affairs, 2008).

The purpose of this study was to explore the intelligence profiles of indigenous pupils from the perspective of MI theory. Indigenous people have a long history of low academic performance in schools, resulting in low educational levels. Some multicultural education theorists argue that it is the lack of cultural-adaptive content and pedagogy that causes indigenous people to lose skills, attitudes, and knowledge needed to function well (LeCompte, 1987; Makuwira, 2008; Wilson, 1991).

MI theory makes its greatest contribution to education by suggesting that teachers need to expand their repertoire of techniques, tools, and strategies beyond the typical linguistic and logical ones predominantly used in the classroom (Armstrong, 2000). However, the cultural or intelligence-adaptive pedagogy will not succeed until we know each student's intelligences profile. It is expected that maximum learning motivation will occur when there is a match between a student's MI strengths and teaching pedagogy.

This paper aims to use MI theory to explore the intelligence profiles of indigenous pupils as a basis for successful implementation of intelligence-adaptive pedagogies. In the early years of schooling, the profile could also help discern ways of developing each student's full spectrum of intelligences and are important for indigenous pupils' learning and development.

■ Perspective

Research on intelligence testing and racial/ethnic minority students has spanned nearly 100 years, beginning with the first reported study of “Negro”-white differences in intelligence by Strong (1913), who administered the Binet scales to participants. Since then, a voluminous literature has accumulated on racial/ethnic differences in “measured intelligence”. This phrase is misleading and tends to perpetuate stereotypes. In fact, the majority of the variation in levels of intellectual ability lies within United States of America racial/ethnic and socioeconomic groups, not between them. That is, for measured intelligence, average differences in performance between groups tend to be quite modest relative to the range of differences within groups. In any event, the indiscriminate use of the term referring to patterns in intelligence scores among racial/ethnic populations ignores the reality of overlap of individual scores between groups and perpetuates the myth that nearly everybody of one racial/ethnic group performs higher than practically everybody of another group.

Many researchers have found that socioeconomic status, home environment cultural bias in tests, and heredity explains why minority students, on average, tend to perform lower than white students on intelligence tests (Brooks-Gunn et al., 1996; Helms, 1997; Herrnstein & Murray, 1994; Nichols & Anderson, 1973; Valencia, 1979; Valencia et al., 1995; Young, 1998). In the past 20 years, traditional notions of intelligence and standardised tests like the IQ test have been scrutinised from a number of perspectives. Gardner has drawn on findings in the fields of developmental psychology and neuropsychology to call into question the narrow focus on linguistic and logical-mathematic skills in traditional tests and theories of intelligence (Gardner, 1983; Hatch & Gardner, 1997).

Gardner refined intelligence as “a bio-psychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in a culture” (Gardner, 1999, pp. 33-34). He laid out eight criteria and identified eight intelligences that satisfactorily fulfilled these criteria. The eight intelligences include linguistic, logical-mathematics, bodily-kinesthetic, musical, visual-spatial, intrapersonal, interpersonal, and naturalist intelligences. Each intelligence is different not only neurologically, but in the symbol systems they belong to, the tools they call on, the core or sub-abilities included in each, and how each is utilised in the real world (Gardner, 1999, pp. 35-41).

Linguistic intelligence consists of phonology, syntax, semantics, and pragmatics. The daily performances of linguistic intelligence include listening, speaking, reading and writing. The sub-abilities of logical-mathematical intelligence are sensitivity to and capacity to discern logical or numerical patterns and the ability

to handle long chains of reasoning. The sub-abilities of visual-spatial intelligence include the ability to perceive the visual-spatial world accurately and the capacity to perform transformations on one’s initial perceptions; a sensitivity to line, shape, space, pattern and colour. The sub-abilities of music intelligence are sensitivity to create in his mind’s ear a perfect replica of sounds, tones, forms, rhythms and beats, and melody. The core components of bodily-kinesthetic intelligence are the ability to control one’s body movements with expertise (the intelligence of the athlete, dancer, mime, and actor) and the capacity to handle objects skilfully (the intelligence of the sculptor, furniture maker, plumber, and seamstress). The core capacity of intrapersonal intelligence is the ability to make fine distinctions in the intentions, motivations, moods, feelings, and thoughts of self. The core capacity of interpersonal intelligence is the ability to make fine distinctions in the intentions, motivations, moods, feelings, and thoughts of other people. The core capacity of naturalist intelligence is the ability to recognise, classify species, showing sensitivity to nature (Armstrong, 1993; Gardner, 1983; Lazear, 1999).

Taking into account psychological, biological, and cultural dimensions of cognition, MI theory presents a more empirically-sensitive and scientifically-compelling understanding of human intelligences and provides an impetus for alternative assessment. Based on MI theory, assessments can be designed to examine and build upon the range of an individual’s cognitive potentials or competences. This kind of assessment is sensitive to what individuals are capable of accomplishing; it also suggests alternative routes to achieving important educational goals (learning mathematics via spatial relations; learning music through linguistic techniques) (Chen & Gardner, 1997).

MI theory emphasises that there is no general problem-solving ability, highlights the roles and achievements valued in a wide variety of cultures, and challenges the belief that intelligences can be adequately assessed through standardised paper and pencil test (Hatch & Gardner, 1997). The central features of the multiple intelligences approach to assessment include valuing intellectual capacities in a wide range of domains; using media appropriate to the domain; engaging children in meaningful activities and learning; and ongoing process (Chen & Gardner, 1997; Walters & Gardner, 1997).

There are increasing numbers of projects, measures, tools and schools developed using multiple intelligence approaches to assessment including Arts PROPEL, Project Spectrum, DISCOVER, MIDAS, and David Lazear’s student behaviour log, intelligence skill games, intelligence foci, complex problem-solving, inventing etc. The ultimate goal of multiple intelligence approaches to assessment is to help create environments that foster individual as well as group potential (Chen & Gardner, 1997).

Table 1: Eight intelligences with sub-items for 15 second grade Amis pupils.

Student	Intelligences Item																							
	Linguistic						Logical-Mathematical						Visual-Spatial						Bodily-Kinesthetic					
	A	B	C	D	E	T	A	B	C	D	E	T	A	B	C	D	E	T	A	B	C	D	E	T
B1	3	4	3	3	2	15	4	4	4	3	3	18	4	3	2	2	2	13	4	2	3	3	4	16
B2	2	1	2	3	3	11	3	3	1	3	1	11	3	3	4	2	3	15	4	2	4	4	4	18
B3	3	4	3	3	4	17	4	4	3	3	2	16	4	3	2	1	2	12	4	2	3	4	1	14
B4	4	4	3	4	4	19	4	3	3	3	3	16	3	4	1	2	2	12	3	1	2	2	3	11
B5	2	4	2	2	4	14	4	3	4	3	1	15	4	2	2	2	2	12	4	2	3	3	2	14
B6	3	4	3	4	4	18	4	3	4	3	1	15	3	3	2	3	2	13	4	1	4	2	2	13
G1	3	4	2	4	3	16	4	4	4	3	2	17	3	3	2	2	2	12	4	1	4	3	2	14
G2	3	4	2	1	4	14	4	4	3	2	1	14	4	3	3	2	2	14	4	3	4	4	4	19
G3	1	1	1	2	2	7	3	2	4	2	1	12	4	1	2	1	2	11	4	1	4	2	4	15
G4	4	4	4	4	4	20	4	4	4	3	2	17	4	4	3	3	4	18	4	3	4	4	3	18
G5	1	4	2	2	2	11	4	4	0	3	1	12	3	4	2	2	2	13	4	1	3	3	2	13
G6	4	4	4	3	4	19	4	3	4	3	2	16	4	4	4	2	4	18	4	3	3	4	2	16
G7	1	4	1	3	3	12	3	4	1	2	1	11	4	3	2	1	4	14	4	1	4	3	3	15
G8	2	4	2	4	3	15	4	4	4	3	1	16	4	4	2	2	4	16	4	2	4	3	4	17
G9	3	4	2	2	3	14	4	3	4	2	2	15	4	3	2	3	2	14	4	4	4	3	4	19
Sub-total	2.6	3.6	2.4	2.93	3.27	14.8	3.8	3.47	3.13	2.73	1.6	14.73	3.67	3.13	2.33	2	2.6	13.8	3.93	1.93	3.53	3.13	2.93	15.46
	Order	3	Mean	14.8	Sum	222	Order	4	Mean	14.73	Sum	221	Order	8	Mean	13.8	Sum	207	Order	2	Mean	15.46	Sum	232

** B1 refers to boy; G1 refers to girl.

Table 1: Eight intelligences with sub-items for 15 second grade Amis pupils (continued).

Student	Intelligences Item																													
	Musical-Rhythmic								Interpersonal							Intrapersonal							Naturalist							
	A	B	C	D	E	T	A	B	C	D	E	T	A	B	C	D	E	T	A	B	C	D	E	T	A	B	C	D	E	T
B1	3	4	4	4	2	17	3	4	4	2	2	15	4	3	3	1	3	14	4	4	1	3	15	4	4	1	3	3	15	
B2	3	1	0	1	2	7	3	1	3	1	2	10	4	4	2	2	2	14	2	4	4	3	2	15	4	4	3	2	15	
B3	3	4	4	4	4	19	2	4	3	3	3	15	4	2	3	4	3	16	2	4	4	3	2	15	4	4	3	2	15	
B4	4	4	4	4	4	20	2	3	3	3	4	15	4	2	4	1	2	13	2	4	3	3	2	14	4	4	3	2	14	
B5	4	4	4	4	3	19	2	3	3	2	4	14	4	3	4	1	1	13	3	4	2	4	3	16	4	4	3	2	16	
B6	3	4	4	4	2	17	3	1	3	2	3	12	3	3	3	3	3	15	3	4	3	3	3	16	4	4	3	3	16	
G1	4	4	4	4	4	20	3	3	3	3	3	15	4	2	2	2	3	13	3	4	4	3	2	16	4	4	3	2	16	
G2	4	4	4	4	3	19	4	3	3	3	4	17	4	4	4	3	3	18	1	4	4	3	2	14	4	4	3	2	14	
G3	2	4	4	3	3	16	3	2	1	2	2	10	4	2	2	2	4	14	1	4	4	3	2	14	4	4	3	2	14	
G4	4	1	4	3	4	16	3	3	3	3	4	16	4	4	4	3	1	16	2	3	4	3	3	15	4	4	3	3	15	
G5	3	1	0	4	3	11	3	4	3	3	2	15	4	3	3	1	3	14	2	4	4	2	13	4	4	2	1	13		
G6	4	4	4	4	4	20	3	3	3	2	4	15	4	4	4	3	1	16	3	4	4	3	4	18	4	4	3	4	18	
G7	3	4	4	4	3	18	2	4	4	3	3	16	2	3	2	3	3	13	3	3	4	3	1	14	4	4	3	1	14	
G8	3	2	4	3	4	16	3	4	3	4	3	17	4	2	3	4	3	16	2	3	4	3	2	14	4	4	3	2	14	
G9	4	3	4	4	3	18	3	2	2	4	4	15	4	3	3	3	1	14	1	4	2	3	2	12	4	4	3	2	12	
Sub-total	3.4	3.2	3.47	3.6	3.2	16.87	2.8	2.93	2.93	2.67	3.13	13.8	3.8	2.93	3.07	2.4	14.6	2.27	2.27	3.4	3	2.67	14.73	3.4	3.8	3.4	3	2.67	14.73	
	Order	1	Mean	16.87	Sum	253	Order	7	Mean	13.8	Sum	217	Order	6	Mean	14.6	Sum	219	Order	4	Mean	14.73	Sum	221	Order	4	Mean	14.73	Sum	221

** B1 refers to boy1; G1 refers to girl1.

■ Method

Setting and the assessment tool

This study was conducted in an elementary school with a largely Amis population of lower socioeconomic status. Observations were conducted in a second grade classroom with 15 Amis students, six boys and nine girls. The researchers developed the intelligence-fair multiple intelligences assessment activities to explore the intelligence profiles of Amis pupils. Intelligence-fair assessments engage the core components (separately or in consort) of particular intelligences. The idea is to create rich, affordance-loaded circumstances which invite individuals to deploy specific intelligences without the necessity of invoking linguistic or logical intelligences en route. In measures, intelligence-fair assessment values intellectual capacities in a wide range of domains. In instruments, intelligence-fair assessment uses media appropriate to the domain. In materials, intelligence-fair assessment engages children in meaningful activities and learning. In context, intelligence-fair assessment is an ongoing process (Chen & Gardner, 1997, p. 35).

The assessment tool used by this study was adapted from Lazear's (1994) student behaviour log. A draft assessment tool was developed according to MI theory, intelligence-fair assessment, and with consideration of the context of school life. This draft was amended after feedback from elementary teachers and experts in multiple intelligences, multiple assessment, and indigenous education. After the validity of the assessment tool was established, observers were trained to observe in the classroom for one month. After the observer reliability had reached .80, the research team started formal assessment activities.

There are 40 intelligence behaviour items to be observed (see Appendix 1). Each of the eight intelligences contains five daily behaviours, representing its core or sub-abilities. Some behaviours were observed through classroom observation and interview, like verbal-linguistic behaviours CE, bodily-kinaesthetic behaviours ABCDE, interpersonal behaviours DE, and intrapersonal behaviours CE.

Some behaviours were assessed through designing intelligence-specific context for students to perform, like verbal-linguistic behaviour B, logical-mathematical behaviours CDE, visual-spatial behaviours D, music-rhythmic behaviours ABCDE, interpersonal behaviours ABC, intrapersonal behaviours AB, and naturalist behaviours ABCDE. Some behaviours were through works or homework of students, like verbal-linguistic behaviours AD, logical-mathematical behaviours B, visual-spatial behaviours ACE, and intrapersonal behaviour D. And some were through paper and pencil test, like verbal-linguistic behaviour A and visual-spatial behaviour B (see Appendix 1).

The study was carried out from 2002 to 2003. Observation was conducted once a week, with two to three observers in one class. Following each observation, the researchers met to discuss the students' strengths and complete the behaviour log for each student.

■ Discussion and results

This paper aims to use MI theory to explore the intelligence profiles of indigenous pupils, to find each pupil's developed intelligences, and to help them to develop. There is no intention to compare intelligences of different ethnic groups. As Gardner states,

In any event, should investigations demonstrate replicable differences among groups, I would regard these differences as starting points for imaginative efforts at remediation, rather than proof of inherent limitations within a group (Gardner, 1999, p. 110).

The intelligence profiles of second grade pupils as a class

Table 1 summarises the eight intelligences with sub-items for 15 second grade Amis pupils. For this class, the order of most students' developed intelligence is as follows: musical-rhythmic, bodily-kinesthetic, linguistic, logical-mathematical, naturalist, intrapersonal, interpersonal and visual-spatial. The coding system: Behaviours within these items are rated on a four point Likert-type scale, with 1 defined as unsatisfactory, 2 as basic, 3 as proficient, and 4 as excellent. Descriptions of the four levels of performance are included for each item. The scoring system: The observers were trained to take notes and score students' behaviours. After the observer reliability had reached .80, the research team started the formal assessment activities. Observation was conducted once a week, with two to three observers in one class. Following each observation, observers met to discuss the students' strengths and complete the student behaviour log for each student.

The intelligence profiles of second grade pupils as individuals

Table 3 shows the intelligence profiles of each of the 15 Amis pupils. For example, the order of boys developed intelligence is as follows: logical-mathematical, musical, bodily-kinesthetic, linguistic, interpersonal, naturalist, intrapersonal and visual-spatial.

Comparing Table 2 to Table 3, linguistic intelligence is the most developed intelligence of B6 and G4, yet it is the least developed intelligence of G2, G3 and G5. Logical-mathematical intelligence is the most developed intelligence of B1, yet it is the least developed intelligence of G2 and G7. Spatial

intelligence is the least developed intelligence of B1, B3, B5 and G2; it is nobody's most developed intelligence. Bodily-kinaesthetic intelligence is the most developed intelligence of B2, G2, G8 and G9, yet it is the least developed intelligence of B4. Music intelligence is the most developed intelligence of B3, B4, B5, G1, G2, G3, G6 and G7, yet it is the least developed intelligence of B2, G4 and G5. Interpersonal intelligence is the most developed intelligence of G5 and G8, yet it is the least developed intelligence of B6, G4 and G6. Intrapersonal intelligence is the most developed intelligence of G1 and G4; it is nobody's least developed intelligence. Finally, naturalist intelligence is the least developed intelligence of G2, G8 and G9; it is none of the pupils' most developed intelligence.

Table 2 and Table 3 are students' self comparative intelligence profiles. Table 4 takes the whole class as normal; students with above mean point intelligences are marked as strong intelligences and vice versa. In this way, Table 4 presents peer comparative intelligence profiles of students. Those

students with six or six above strong intelligences are students of general strong intelligences. Those students with six or six above weak intelligences are students of general weak intelligences. Table 4 shows B1, B3, G4, G6 and G8 are students of general strong intelligences; G3 and G5 are students of general weak intelligences.

The study challenged existing stereotypes of ethnic groups. Generally speaking, the findings show that eight students' most developed intelligence is musical intelligence. Most pupils in this class are also good at bodily-kinesthetic and linguistic intelligence. However, in general, these second grade pupils do not have very high developed interpersonal intelligences which are traditionally stereotyped as indigenous pupils' capabilities. Furthermore, each student has his/hew own unique intelligence profile. Do Amis pupils have particular intelligence profile as a group? Or are their individual differences greater than their group similarities? We need further studies to cautiously answer this question.

Table 2: Each intelligence with the number of most and least developed students.

Intelligences	Linguistics	Logical-Mathematics	Visual-Spatial	Bodily-Kinesthetic	Musical	Inter-personal	Intra-personal	Naturalist
The number of students of most developed/least developed	2/3	1/2	0/4	4/1	8/3	2/3	0/2	0/3

Table 3: The intelligence profiles of each of 15 Amis pupils.

	The order of developed intelligences								
		1	2	3	4	5	6	7	8
	Students	B1	LM	M	BK	L/Inter/N	Intra	VS	
	B2	BK	VS/N	Intra	L/LM	Inter	M		
	B3	M	L	LM/Intra	Inter/N	BK	VS		
	B4	M	L	LM	Inter	N	Intra	VS	BK
	B5	M	N	LM	BK/Inter/L	Intra	VS		
	B6	L	M	N	Intra/LM	VS/BK	Inter		
	G1	M	LM	L/N	Inter	BK	Intra		
	G2	BK/M	Intra	Inter	L/LM/N/VS				
	G3	M	BK	Intra/N	LM	VS	Inter	L	
	G4	L	VS/BK	LM	M/Inter/ Intra				
	G5	Inter	Intra	VS/BK/N	LM	L/M			
	G6	M	L	VS/N	LM/BK/ Intra	Inter			
	G7	M	Inter	BK	VS/N	Intra	L	LM	
	G8	Inter/BK	Intra/VS/ LM/M	L	N				
	G9	BK	M	LM/Inter	L/VS/Intra	N			

Why is music the most developed intelligence of most pupils? These limited data do not allow us to address this question in detail. However, it is worth mentioning that the music environment is insufficient in this elementary school. There is no music teacher in the school and although their sense of rhythm and melody are strong, the pupils in this study have no music class at all. The result of this study is consistent with Kuo et al. (1998) who found that Native Taiwanese students obtained higher scores in areas such as music, athletics, dance, and visual arts (also see Mathur, 2008).

Once we obtain students' intelligence profile, teachers can create a "bridge" from students' multiple intelligence strengths to appropriate learning strategies. It emphasises using students' particular strengths to assist in areas of particular difficulty. Teachers can use MI theory to develop activities and learning strategies that are tailored to students' strengths. Or teachers can apply his/her understanding of MI theory – and of their students' particular strengths and preferences – to develop different ways to engage students in a particular topic or skill. Future studies are recommended to develop intelligence-adaptive pedagogy which should help indigenous pupils to successfully learn. The development of other cultural and intelligence appropriate assessment tools to understand indigenous pupils' intelligence profiles are also highly recommended.

Although knowing the ethnic group's intelligence profile helps educators design a school's physical environment, curriculum, instruction and assessment, it is important to remember that, for measured intelligence, average differences in performance between groups tend to be quite modest relative to the range of differences within groups. For this study, while nearly half of the pupils' most developed intelligence is music; more than half of the pupils' most developed intelligence is not music. It is recommended that researchers observe both the whole ethnic group and individual pupil's intelligence profile to help each pupil develop their potential.

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Table 4: Pupils with strong or weak intelligence.

	Intelligence										The number of general strong intelligence	The number of general weak intelligence
	Linguistics	Logical-Mathematics	Visual-Spatial	Bodily-Kinesthetic	Musical	Inter-personal	Intra-personal	Naturalist				
B1	strong	strong	weak	strong	strong	strong	strong	weak	strong	strong	6	2
B2	weak	weak	strong	strong	weak	weak	strong	weak	strong	strong	3	5
B3	strong	strong	weak	weak	strong	strong	strong	strong	strong	strong	6	2
B4	strong	strong	weak	weak	strong	strong	strong	weak	weak	strong	4	4
B5	weak	strong	weak	weak	strong	weak	strong	weak	strong	strong	3	5
B6	strong	strong	weak	weak	strong	weak	strong	strong	strong	strong	5	3
G1	strong	strong	weak	weak	strong	strong	strong	weak	strong	strong	5	3
G2	weak	weak	strong	strong	strong	strong	strong	strong	weak	weak	5	3
G3	weak	weak	weak	weak	weak	weak	weak	weak	weak	weak	0	8
G4	strong	strong	strong	strong	weak	weak	strong	strong	strong	strong	7	1
G5	weak	weak	weak	weak	weak	weak	strong	weak	weak	weak	1	7
G6	strong	strong	strong	strong	strong	strong	strong	strong	strong	strong	8	0
G7	weak	weak	strong	weak	strong	strong	strong	weak	weak	weak	3	5
G8	strong	strong	strong	strong	weak	strong	strong	strong	weak	weak	6	2
G9	weak	strong	strong	strong	strong	strong	strong	weak	weak	weak	5	3

Students

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■ Appendix 1

STUDENT BEHAVIOR LOG

Student Name:	
Age: 8	Date of Observation:

VERBAL-LINGUISTIC BEHAVIORS				
A. Can write complete sentence (judge by students' worksheet)				
1	2	3	4	
1) incomplete sentences, unclear meaning				
2) complete sentences, unclear meaning				
3) complete sentences, clear meaning				
4) complete sentences, creative meaning				
B. Can read textbook (read four lessons on Nan-I version)				
1	2	3	4	
1) read none lesson				
2) read one to two lessons				
3) read three lessons				
4) read four lessons				
C. Can orally express his/her own thinking (classroom observation)				
1	2	3	4	
1) not at all				
2) somewhat				
3) thoroughly				
4) thoroughly and logically				
D. Can copy correctly (calculate word errors in students' Chinese worksheet)				
1	2	3	4	
1) 31-40 errors				
2) 21-30 errors				
3) 11-20 errors				
4) 1-10 errors				
E. Can concentrate on Chinese class (classroom observation, accidental records and students self evaluation)				
1	2	3	4	
1) unfocused				
2) somewhat unfocused				
3) concentrated				
4) concentrated and responsive				
LOGICAL-MATHEMATICAL BEHAVIORS				
A. Can distinguish 1-200 numbers (mathematical sheet and classroom observation)				
1	2	3	4	
1) distinguish none numbers				
2) distinguish units digit				
3) distinguish tens digit				
4) distinguish 1-200 numbers				

B. Can operate concrete objects (measurement worksheet)				
1	2	3	4	
1) all wrong				
2) pass 1-5 items				
3) pass 6-8 items				
4) pass 9-11 items				
C. Can calculate numbers (situation problem solving – flea market)				
1	2	3	4	
1) can make units digit plus				
2) can make units digit minus				
3) can make tens digit plus				
4) can make tens digit minus				
D. Can find out the inconsequence in daily life (situation problem solving)				
1	2	3	4	
1) correct 1-3 items				
2) correct 4-6 items				
3) correct 7-9 items				
4) correct all (10) items				
E. Can make simple logical reasoning				
1	2	3	4	
1) correct 0-4 items				
2) correct 5-7 items				
3) correct 8-11 items				
4) correct 12 (all) items				
VISUAL-SPATIAL BEHAVIORS				
A. Paint colorfully (art works)				
1	2	3	4	
1) use no color				
2) use less than two colors				
3) use 3-5 colors				
4) use many colors blendingly				
B. Has a good sense of direction (direction worksheet)				
1	2	3	4	
1) all wrong				
2) correct 1-5 items				
3) correct 6-8 items				
4) correct 9-11 items				

C. Can create three dimension work (student's clay works)				
1	2	3	4	
1) no similarity 2) 50% similarity 3) 80% similarity 4) 100% similarity				
D. Has a good sense of shape discernment (shape discernment worksheet)				
1	2	3	4	
1) all wrong 2) correct 1-2 items 3) correct 3 items 4) all correct				
E. Can draw objects in their proportion (student's figure painting)				
1	2	3	4	
1) out of proportion 2) 50% similarity 3) 80% similarity 4) 100% similarity				
BODILY-KINESTHETIC BEHAVIORS				
A. Can complete the appointed physical movement in 10 meters back marker				
1	2	3	4	
1) cannot complete 2) partially complete 3) mostly complete 4) exactly complete				
B. Can use body gestures and physical movement to express him/herself				
1	2	3	4	
1) use no gesture 2) use gestures occasionally 3) use gestures to make living expression 4) use various appropriate expressive gestures and body language				
C. Can perform coordinated motor skills (folk dance)				
1	2	3	4	
1) cannot follow movement at all 2) can partially follow movement 3) can properly follow movement 4) exactly and fluently follow movement				
D. Can make coordinated clay (observe students making clay)				
1	2	3	4	
1) completely in-coordinated 2) coordinated 3) sloppy 4) sloppy and clean-limbed				

E. Likes jumping rope (the record of borrowing jumping rope)				
1	2	3	4	
1) 0-20 times 2) 21-40 times 3) 41-60 times 4) above 61 times				
MUSICAL-RHYTHMIC BEHAVIORS				
A. The degree of loving music(self-evaluated worksheet)				
1	2	3	4	
1) points -21~-10 2) points 9~0 3) points 1~10 4) points 11~21				
B. Can discrete tone color of different rhythm instrument (six kinds of instruments, 12 items)				
1	2	3	4	
1) correct 1-5 items 2) correct 6-8 items 3) correct 9-11 items 4) all correct				
C. Can discrete different musical forms (nursery rhyme, popular music, natural song, indigenous music)				
1	2	3	4	
1) correct one form 2) correct two forms 3) correct three forms 4) correct four forms				
D. Can mimic a variety of specific rhythms and beats				
1	2	3	4	
1) cannot mimic 2) partially mimic 3) mostly mimic 4) exactly mimic				
E. Can reproduce a variety of melody				
1	2	3	4	
1) cannot reproduce 2) partially reproduce 3) mostly reproduce 4) completely reproduce				
INTERPERSONAL BEHAVIORS				
A. Can point out classmates' characteristics (tape record)				
1	2	3	4	
1) cannot point out 2) can point out one-two classmates 3) can point out three classmates 4) can point out more than three classmates				

B. Has good relationships with classmates (peer evaluation worksheet)			
1	2	3	4
1) below -10 2) between -9~0 3) between 1-10 4) above 11			
C. Can discrete people' feeling (face photo)			
1	2	3	4
1) correct one item 2) correct two items 3) correct three items 4) all correct			
D. Likes to help others (classroom observation & teachers' observation)			
1	2	3	4
1) dislike 2) occasionally help others 3) often help others 4) always help others			
E. Highly participate class activities (classroom observation and teachers' observation)			
1	2	3	4
1) no participation 2) passively participate 3) seldom participate 4) often participate			
INTRAPERSONAL BEHAVIORS			
A. Can define and understand the whys of personal likes and dislikes			
1	2	3	4
1) cannot define nor understand 2) can define personal likes or dislikes 3) can explain the whys of personal likes or dislikes 4) can make examples to explain the whys of personal likes or dislikes			
B. Can define and understand the whys of personal strength and weakness (interview)			
1	2	3	4
1) cannot define nor understand 2) can partially define personal strength and weakness 3) can fully define personal strength and weakness 4) can explain the whys of personal strength and weakness			
C. Can express one's own idea (classroom observation)			
1	2	3	4
1) cannot 2) occasionally 3) often 4) usually and gladly			

D. Has the habit of keeping journals (journal records)			
1	2	3	4
1) none 2) 1-3 self-reflective journals 3) 4-6 self-reflective journals 4) 7-10 self-reflective journals			
E. Can control one's own emotional states, feelings, and moods (classroom observation and teacher observation)			
1	2	3	4
1) cannot control 2) seldom control 3) occasionally control 4) always control			
NATURALIST BEHAVIORS			
A. Can observe and distinguish insects badly parts (glowworm worksheet)			
1	2	3	4
1) cannot distinguish any parts 2) can distinguish configuration 3) can distinguish all parts 4) can distinguish all parts and detailed described			
B. Likes to plant (plant growth record)			
1	2	3	4
1) dislikes plants 2) likes plants, but don't want to plant 3) likes plants, but fail to plant 4) likes plants, and take good care of it			
C. Can observe and take record of plant growth			
1	2	3	4
1) dislike 2) occasionally take record 3) take rough notes of each stage 4) take detailed notes of each stage			
D. Likes Nature (I Like Nature worksheet)			
1	2	3	4
1) -30~-15 points 2) -14~0 points 3) 1-15 points 4) 16-30 points			
E. Understands one's own living environment			
1	2	3	4
1) don't know anywhere 2) know one to two places 3) know local famous places 4) know local famous places and their characteristics			