

How Do Medical Students Learn: An Application of Multiple Intelligences Theory

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How Do Medical Students Learn: An Application of Multiple Intelligences Theory

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English

Abstract: This paper seeks to investigate how medical students who seem to be struggling with their classes can be helped by teachers to manage their studies more appropriately and hopefully make better progress as a result. To facilitate an understanding of the issues involved in this study, basic matters concerning the theory of learning, learning styles, learning strategies and multiple intelligences theory will be briefly outlined. An integral element of this investigation is an on-going action research study that has been undertaken by the author over the past several years at several university campuses in Japan. Some of the data gathered in that previous research which is useful as a basis for comparison, as well as some preliminary conclusions on this study, will also be detailed.

Key words: learning, multiple intelligences, medical students

Flawed assumptions

A basic assumption regarding learning in educational institutions generally appears to be that learners with the requisite amount of intelligence, as determined by entrance examination success, taught by teachers with professional knowledge and skills results in learning. Indeed, every teacher would be pleased if all of their students learnt what was taught and passed their courses; however, in reality not all students succeed in acquiring the knowledge required by their course of studies, but they can still receive a passing grade. What is at fault? The university education system? Demographic pressures? Declining student ability? Unrealistic course expectations? Outdated teaching styles? Teachers who are pressured to pass students who actually should be failed? Student expectations of leniency? Research into learning over the past two decades has shown that the former assumption about learning is rather naive. What has become clear from recent research is that the classroom is in fact a dynamic environment where numerous changing, complex factors come into play to determine the learning outcome for each individual student. Teachers, in order to provide the maximum opportunity for producing positive learning outcomes, need to reach a deeper understanding of the theory of

learning and learner behaviors. This applies in particular to the situation in schools of medicine in Japan.

Learning

How can the term 'learning' be defined? From the time we are born and take our first breath until the moment we breathe our last, we are constantly learning. Learning is not just memorizing facts from books or teachers; it is an active process of building knowledge that involves the whole learner in thinking, feeling, discussing, planning and doing. In addition, learning is not only about having "brains"; it is a combination of factors such as:

- (1) attitude (how interested a learner is to learn),
- (2) organization (how a learner organizes their time for learning),
- (3) strategies (using the best methods for learning).

Put simply, learning is an active process of processing inputs to construct an understanding which becomes knowledge.

But a multitude of factors come into play which affect the pace and degree of learning to a very large extent. Of course, all learning takes place in the brain of the learner, and at this point in time the process is still largely a mystery as it is still similar to a "black box" where the processes takes place but cannot be fully understood because it cannot be clearly seen and proved. However, recent studies on student achievement reveals a marked decline in student ability. This in itself should be enough to set alarm bells ringing in institutions of higher learning.

Learning styles

Students study to achieve a result, which can either be positive or negative. Successful students achieve positive results. It is how these students study to achieve positive results that is of major interest to language researchers. However, teachers need to take an interest in students who fail to achieve positive results as their failure has predominately been brought about by their particular study/behavior patterns; an examination of these patterns allows the opportunity to diagnose what a student's specific problem areas may or may not be.

Learning styles can be defined as a general, consistent, often unconscious tendency of how students perceive, react to, and interact with new information to build knowledge and understanding. The learning styles considered in this study may be grouped as:

- (1) visual - seeing words in books and workbooks, viewing films and

- using other visual materials like diagrams.
- (2) auditory - hearing oral explanations, listening to lectures, other students, and taped materials.
- (3) kinesthetic - learning by physically getting involved in things like role-plays and simulations.
- (4) tactile - "hands-on" learning where learners experiment with what they have learnt in real situations.
- (5) individual - those who learn best when they study alone.
- (6) group - those who learn best when they can interact with others.

It is because individual learners learn in different ways that teachers need to consider how to accommodate different learning styles in the classroom to facilitate effective learning. This is difficult to do because learning takes place in the head of each learner and it may be difficult to determine the degree of successful transfer of learning. Many books focus on learning techniques - techniques for accelerated learning, note making, speed reading, mind mapping, remembering, writing essays, etc.. But learning is much more than just a set of techniques. Learning depends on context, that is, what someone is learning and why they are learning it will influence how best to learn. There are as many ways of learning as there are reasons for learning.

Learning strategies

Learning strategies are directly related to learning styles. Indeed, strategies are often the outward manifestation of particular styles.

What are learning strategies? Let's start with some straightforward definitions. The Cambridge International Dictionary of English (1995) gives the following:

"strategy : a detailed plan for achieving success in a given situation, or the skill of planning for such situations."

"stratagem : a carefully planned way of achieving or dealing with something, often involving a trick."

The definition given for "stratagem" in particular best describes strategies for learning. Learning strategies have one basic goal and that is to facilitate learning. In particular, they are the specific actions or behaviors intentionally used by a learner to help them learn, understand and retain new information with increased efficiency. Best of all, these actions can be extremely simple.

This broad description of strategies covers of a wide range of learning actions which facilitate all types of

learning. An often quoted source for information of these strategies is Rebecca Oxford's *Language Learning Strategies* (1990, cited in Brown, 1994) which listed fifty specific strategies divided into six general categories. Brown (1994) divided these into just two: direct/cognitive and indirect/metacognitive. Examples of these include the following:

Direct or Cognitive Strategies

- (1) *remembering* : using flashcards, rhymes, making a mental picture, word association, reviewing old lessons.
- (2) *using all our mental processes* : using new words in different ways, make summaries, watching movies/videos in the target language, trying to find patterns, practicing sounds, saying/writing new terms multiple times.
- (3) *compensating for missing knowledge* : making guesses, using gestures, paraphrasing, bridge gaps, anticipate what's next.

Indirect or Metacognitive Strategies

- (4) *organizing and evaluating learning* : plan study time, make clear goals, evaluate progress, look for additional opportunities to use knowledge, analyze mistakes.
- (5) *managing emotions* : try to relax, don't be afraid of mistakes, reward yourself for doing well, talk to others how you feel.
- (6) *learning cooperatively* : ask other students for help, ask native speakers for help, practice the L2 with others, help others correct their mistakes.

The notion of learners using such techniques or strategies to advance their studies of a second language is relatively new. Prior to the 1980's, only a few descriptive studies by language researchers of strategies used by "good language learners" can be found (e.g. Rubin 1975, and Stern 1975). These studies suggested that all learners could learn from the effective ways "good language learners" seemed to process information through their study habits and the methods they employed. However, in the field of cognitive psychology extensive research had been done in the prior decade on the influence of learning strategies on reading comprehension and problem solving. And although these two bodies of research had proceeded independently of each other with very little cross-over, what did develop in common was a concentration on the mental processes involved. It wasn't until 1986-88 that research papers were published (Garner 1986, Rabinowitz and Chi 1987, and Mayer 1988, cited in O'Malley and Chamot, 1990) where learning strategies were integrated with cognitive theory in an attempt to explain the mental processes in play.

One of the most significant suggestions made in the study of learning strategies was that they were not limited

to application only by highly capable or "gifted" learners. Given their wide-ranging nature, it was suggested that these strategies could be catalogued and used by other learners who had not discovered such methods by themselves. Indeed, if students were introduced to new strategies and told why a particular strategy will help them in a learning task, they may well be more likely to use it when given some initial support by the teacher.

Gardner's theory

Research on how the human brain works appears to show that different parts of the brain process information in different ways. Indeed, studies have shown that a fairly clear delineation exists in the functions handled by the brain. For most people, the right hemisphere of the cerebral cortex appears to deal with rhythm, color, space, images, and daydreams. The left hemisphere of the brain appears to deal with words, numbers, logic, analysis, and lists. Further findings seem to indicate that most people have a natural strength in either left-hemisphere or right-hemisphere processing. However, if these findings were taken superficially, it could lead some individuals to believe things like:

"I'm a right-brained learner and therefore I am holistic, creative, artistic, intuitive, emotional and disorganized, so I'm not good at" , or

"I'm a left-brained learner and therefore I am intellectual, logical, rational, linear, academic, and super-organized, so I'm not good at" , in which case these labels become self-fulfilling prophecies. The simple fact is that for real learning to take place everyone needs both sides of their brain stimulated and working because we literally cannot learn with half a brain. This being the case, teachers need to engage their students in "whole-brain learning" in the classroom in order to maximize the learning experience.

Rather than getting side-tracked with this brain-hemisphere dominance theory , a wider perspective may be gained by considering Dr. Howard Gardner's 1993 theory of Multiple Intelligences (MI). This theory does not contradict the left/right brain theory; rather, it gives the theory a more human face. Basically, Gardner believes there are eight different intelligences which build the broader range of human potential:

1. linguistic,
2. bodily or kinesthetic,
3. logical or mathematical,
4. musical,
5. spatial,
6. interpersonal (social),
7. intrapersonal (self-knowledge, intuition)
8. naturalistic (nature smart).

Gardner's theory hypothesizes that each person has all eight intelligences, but usually has one or two of these in greater degree. He goes on to suggest that education should aim to provide opportunities for developing all intelligences, but states that too often educators focus primarily on the first four. He says that the intelligences

can be both the content of instruction and the means. In other words, an educator can teach music but also use music as a teaching method. By making a conscious effort to develop our less-developed intelligences we will, of course, use right and left-brain functions but with less risk of seeing oneself as primarily dominated by one or the other. It is far healthier for learners to see themselves as an intelligent person, maybe being more intelligent in some areas than others, but working to build their intelligences in the areas where they may perceive some weakness. The first step to achieving this goal was taken in this research study (outlined below); the concept of multiple intelligences was introduced to the students and then they were asked to complete a questionnaire to highlight their strengths and what areas they might have to give further consideration in order to more fully develop their maximum potential.

The 2002 research study

The aim of the study carried out by O'Dowd in 2002 was to investigate the degree to which Japanese university students at Hamamatsu University, School of Medicine have learning style preferences, how this correlated with their perceptions of themselves as learners, and the degree of focus they currently exhibit.

Three previous studies have been carried out in this area of learner preferences; Reid's 1987 study (cited in Hyland, 1994), Hyland's 1994 study which mirrored Reid's, and O'Dowd's 1999 study which took an original approach. Hyland's study used the survey instrument designed by Reid (see appendix) to determine Japanese learners' individual learning preferences, and subsequently confirmed Reid's findings that there was no strong learning style preference. O'Dowd's 1999 study used an original learning practices inventory to collect information. In the 1999 study, O'Dowd designed a survey form (see appendix) in which students were asked to reply to six questions regarding their current perceptions of themselves as learners studying at college, the types of study methods they preferred, and how they approached their study. The survey form was translated into Japanese and then distributed to students studying at a major university in Japan; one hundred and sixteen surveys were returned. The scope of this study, although small in scale, was wider in scope than the previous studies.

In this preliminary study centering on medical students, two types of survey forms were used; the learning practices inventory used in the 1999 study and a learning style questionnaire based on multiple intelligences theory that was adapted from a form first developed by Tanner (2001). The target group was ninety medical students in their first year at the School of Medicine, comprising seventy-four males and sixteen females. As a basis for comparison, I also surveyed forty-one female students attending a Women's Junior College in Tokyo and forty-four students attending a four-year university in Mishima, twenty-one females and twenty-three males.

Before proceeding to the analysis of results of the current study, it must be pointed out that the use of questionnaires to collect data has limitations and the findings should be regarded as broad indications rather than absolutes.

Preliminary data results

A preliminary analysis of the data obtained from the learning practices inventory revealed the following:

Medical students

Sample size: 74 male + 16 female = 90

Question 1: The majority of medical students (62.2%) regard themselves as "average" students, with 14.4% responding they liked to learn.

14.4% also responded they were "not good at learning new things".

Question 2: 22% of medical students replied their grade average is mostly A's, 44% mostly A's & B's, 14% for mostly B's, 13% for B's & C's, and 3% for "mostly C's, and 4% for C's and below.

Question 3: 40% thought they studied all subjects the same, with 20% choosing they studied English better while 34.4% studied other subjects better.

Question 4: Asked to indicate which of the study methods they used most commonly, the majority (78.9%) selected multiple methods of learning, that is, three or more choices. The most common choices were (in order):

1. study during class (63%)
2. doing assigned homework (43%)
3. checking dictionaries (50%)
4. reading the text (48.9%)
5. note taking (40%)
6. cramming & revision by themselves (both 37.8%)
7. study in the library (34.4%)
8. memory (27.8%)

Question 5: 51.1% responded they studied very late at night. 33.3% responded they studied after their evening meal. 16.7% studied only at school with 12% studying at lunch time.

Question 6: 57.8% of students responded they studied less than one hour per day on average, while 21.1% studied 1 to 2 hours per day.

5.6% of students responded they studied only before a test.

Junior college students

Sample size: 41 females

Question 1: The majority of junior college students (65.8 %) regard themselves as

"average" students, with 19.5% responding they liked to learn.

14.6% responded they were "not good at learning new things".

Question 2: 7% of students replied their grade average is mostly A's and 41.5% for

A's & B's. 24.4% for mostly B's, 22% for B's & C's, and 4.9% for mostly C's.

Question 3: 58.5% thought they studied all subjects the same, with 24.4% choosing

they studied English better and 17% they studied other subjects better.

Question 4: 29.3% of respondents had a strong preference for studying in class as

their preferred method. The majority(83%) selected multiple methods of

learning, that is, three or more choices.

The most common choices were (in order):

1. checking dictionaries (61%)

2. note taking (56%)

3. study during class (48.8%)

4. doing assigned homework (31.7%)

5. memory (26.8%)

6. cramming & revision by myself (both 24.4%)

Question 5: 41.5% responded they studied very late at night. 24.4% responded

they only studied at school. 12% responded they studied after their evening meal.

Question 6: 75.6% of students responded they studied less than one hour per day

on average, while 14.6% studied 1 to 2 hours per day. One student

responded

they studied only before a test and one student replied she never studied.

Four-year university students

Sample size: 23 male + 21 female = 44

Question 1: The majority of 4-year university students (79.5%) regarded

themselves as "average" students, with 13.6% responding they liked to learn and only one who responded they were "not good at learning new things".

Question 2: 45.5% of students replied their grade average is "A's & B's", 25% for "B's",

20.4% for "B's & C's", and only one for "mostly C's".

Question 3: 40.9% thought they studied all subjects the same, with almost equal

numbers choosing they studied English better (31.8%) or that they studied other subjects better (27.2%).

Question 4: All selected multiple methods of learning, that is, two or more choices;

the mode was 3 choices while the median was 5 choices.

The most common choices were (in order):

1. checking dictionaries (72.7%)
2. doing assigned homework (63.6%)
3. note taking (56.8%)
4. study during class (36.6%)
5. memory & revision by themselves (both 34%)

Question 5: 40.9% responded they studied after their evening meal.

52.3% responded they studied very late at night.

Question 6: 47.7% of students responded they studied less than one hour per

day on average, while 40.9% studied 1 to 2 hours per day.

A preliminary analysis of the data obtained from the MI learning strategies questionnaire revealed the following:

Medical students: Male, n = 29

type	range	median	mode
Bodily-kinesthetic	28-7	16	13/19
Interpersonal	29-10	18	17
Intrapersonal	27-12	20	16
Linguistic	26-11	19	19
Logical-mathematical	28-12	17	17
musical	27- 7	19	16
Naturalistic	27-12	18	18
Spatial	25-12	19	17

Medical students: Female, n = 16

type	range	median	mode
Bodily-kinesthetic	22-12	16	16/22
Interpersonal	26- 9	19.5	20
Intrapersonal	24-15	19.5	19
Linguistic	28-12	19	16/19
Logical-mathematical	25-16	18	18

musical	24-10	20	20.5
Naturalistic	27-10	17.5	16/23
Spatial	29-11	18	18.5

Junior college students: Female, n = 41

type	range	median	mode
Bodily-kinesthetic	23-12	18	20
Interpersonal	26-12	18	22
Intrapersonal	25-12	19	16
Linguistic	24-11	19	19
Logical-mathematical	23- 9	16	14
musical	25-13	19	18
Naturalistic	26-12	18	17.5
Spatial	25-11	20	19

Four-year university students: n = 16

type	range	median	mode
Bodily-kinesthetic	26-16	20	17
Interpersonal	27-13	18	18
Intrapersonal	25-16	22.5	22.5
Linguistic	23-11	18	18.5
Logical-mathematical	24-11	15	14
musical	21- 7	17.5	19.5
Naturalistic	27-11	16.5	16
Spatial	24-12	19.5	19

Discussion

An interesting point common to all three groups of students may be found in the correlation between the students' perceptions of themselves as learners, the grades they reported they achieve and the amount of time they study per day on average. Does it seem reasonable for "average" students who study less than one hour per day to achieve "A's & B's"? When students are questioned directly about grade expectations, most seem to

consider "B" (70 to 79%) as an "average grade".

Question 4 shows that medical students are generally more serious when it comes to studying in class and doing homework than are the other two groups. The responses of the medical students may also reflect the greater degree future certainty of their career paths than displayed by other students. It is also interesting to note the responses which students scored poorly. Two responses in particular are worthy of comment: asking teacher questions (11%) and talking to teacher (12%) in which medical students scored below both other groups. This may be a reflection of the traditional methods of instruction which predominate in both secondary and tertiary levels in Japan. It is therefore not surprising that the results of this question showed a strong disposition to passive, narrow, individual learning styles. These results mirrored the results obtained by Hyland (1994) and O'Dowd (1999) which found the following :

1. Japanese students had no strong learning style preferences,
2. They favored many minor learning preferences,
3. They favored tactile, kinesthetic and individual learning styles.

Another result not unexpected was that cramming, or studying just before a test, is far more common in medical students. Their success at entering the medical university is testimony to their ability to study to pass examinations. And once accepted, many students continue to cram for all their examinations because this particular practice has delivered success in the past; they see no need to alter this poor study habit. It is generally accepted that cramming does not produce real learning, as what is crammed is not stored in long-term memory; as such, cramming will not develop the basis of deep understanding of the vast amount of medical knowledge needed. And students who consistently miss classes and the opportunities to put learning into practice or practical application will not acquire such knowledge through cramming.

In regard to managing their study time, students reported that their home study time consisted almost entirely of "doing homework"; supplementary study apart from homework assignments is given a very low priority as it was deemed that doing homework is "doing enough". This finding suggests that much of the learning done by students is quite shallow, making it difficult for them to be able to build up an intelligent grasp of the subject matter taught. This raised the real problem of learning to use time better. Learners who cannot use one hour productively are not likely to learn more or better if they have a day, a week, a month or a semester. If they can be taught to raise their learning productivity through the use of learning strategies, their study time will be better spent.

The multiple intelligences questionnaire also yielded some interesting results. In particular, female medical

students in almost all categories showed greater potential ability than did male students. Male medical students generally also scored lower against four-year university students in the categories of interpersonal, intrapersonal, musical and spatial; but, as could be expected, medical students scored higher on logical-mathematical. Taken together with the results obtained from the learning styles survey, it is clear to see there is much room for improvement.

What do "Good Learners" do?

Just as a teacher's teaching methods are governed by their beliefs about education, their students and classroom roles (O'Dowd, 1995), students' methods of study are also largely grounded in various factors such as their motivation, previous study experience, desired outcomes, goals, and self-management. In most formal learning situations, learners are asked to do something with their knowledge - write an essay, do a research report, a project, a presentation, an examination. Successful learners would be those who were able to communicate their acquired knowledge clearly and concisely. They would have completed what was expected of them, restated what they know, and have met the required expectations of the examiner/teacher.

Observations of the attributes of "Good Learners" have been catalogued in many research studies and publications. However, these are usually seen as "desirable" individual traits rather than part of an overall set of integrated learning strategies adopted by good learners to facilitate their learning. The following attributes associated with Good Learners (GL) are all firmly grounded in the direct and indirect learning strategies outlined previously :

1. GL think about themselves as learners. They think about how they will learn- skills, strategies, things that work, things that don't work.
They build a repertoire of strategies that work for them.
2. They think positively about their learning and plan how they will study.
GL make conscious use of skills and strategies to get a handle on learning. It takes more time in the beginning, but when it starts to feel natural, they reap the rewards because they can learn much more in less time.
3. They have developed good study habits. GL have a set time and place to study. They revise regularly and don't procrastinate.
4. They often like to work with other students to exchange views.
This helps the GL to anchor learning and makes sure that they understand and remember key points.
5. They allow time to build their knowledge base. GL allow time to

build knowledge, and see themselves growing as learners.

They realize learning isn't a quick fix. - like jogging, they need to work at it to gradually build learning stamina.

6. They set goals and monitor their time to make maximum use of it.

GL realize procrastination is the worst enemy of learning.

GL are persistent and positive.

7. They talk about their studies with the teacher & other students.

GL often talk with other learners and the teacher for the same

reason - to confirm that they understand what has been taught.

GL also frequently talk to their teacher, seeing it as an opportunity to actually use what they have learnt.

8. They are often not afraid to ask questions. GL often ask their teacher to

clarify points or to give more examples when they don't understand something.

It is clear to see in these attributes (and in others that could be added to this list) that learning strategies are an integral part of successful learning.

Probably above all other considerations, a good learner needs to focus on what needs to be learnt and how to learn it. Whether the learner is a morning, afternoon or night learner, silent or noise learner, solitary or group learner, nothing substitutes for this focus. To develop this focus, it is important that students are clear about :

(1) What they are going to learn (their knowledge objectives),

(2) Why (their purpose for learning - motivation), and

(3) How they can achieve their goals effectively (the effective use of learning strategies).

Even though a considerable body of research has been devoted to analysis of the habits of good language learners, relatively little has been done on learning strategies themselves. The present classroom research study was therefore undertaken to investigate how much of a role learning styles and strategies played in the study efforts of medical students studying at the Hamamatsu campus with the aim of creating greater awareness of the critical issues involved.

Conclusion

Few learners at any level integrate new learning strategies naturally into their learning. Teachers need to take an active part in helping learners recognize the effective strategies they already employ, and whether they could use other strategies to get improved results with less time and effort. The teacher's role as expert learner in modeling and drawing students' attention to the benefits of using these learning strategies cannot be understated.

Of course, the use of learning strategies should not be regarded as a panacea for all the problems associated with learning in the classroom as student preferences and choices are also affected by personal and environmental factors, so many individual exceptions will persist. It also needs to be emphasized that changes in student learning styles will not occur "overnight"; it often takes some time for learners to become comfortable with "new ideas", and some students may resist any change altogether. Practicing strategies may initially be slow and uncomfortable for some students, especially those who may need them most. However, persistence and understanding by the teacher in identifying learning style differences and seeking to expand students' learning horizons will not be without some benefit to most students.

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Appendix 2

学習実態調査

made by G. O' Dowd

1. 学習者としての自分をどう思いますか。
 - 新しいことを学ぶのは得意ではない。
 - 学習者としては普通である。
 - 良い学習者である。～ 学ぶのが好きである。
 - 大変良い学習者である。～ 学ぶのが大好きである。
2. 学校での成績はどのくらいですか。(全科目)
 - ほとんどA AとB
 - ほとんどB BとC
 - ほとんどC Cとそれ以下
3. 他の教科より英語は良いですか、悪いですか。
 - 英語の方が良い 他の教科の方が良い
 - 同じくらいである。
4. どのように勉強しますか。
 - 授業中に勉強する 宿題をする
 - テキストを読む 辞書を引く
 - 自分で訳す 予習をする
 - ノートをとる 図書館で勉強する
 - ビデオや映画で勉強する 会話の練習をする
 - 先生と話をする 先生に質問する
 - 詰め込み勉強をする 英字新聞を読む
 - ラジオを聞く 英語のテレビ番組を見る
 - 手紙を書く 学習用のカセットテープを聞く
 - 暗記する 練習問題をする
 - 他の本を読む 雑誌を読む
5. いつ勉強しますか。
 - 朝早く 学校でだけ
 - 学校の昼休み 放課後学校で
 - 夕食前に家で 夕食後に家で
 - テレビを見た後で 夜おそく
 - その他 _____
6. 1日にどのくらい勉強しますか。
 - 1時間以下 1時間から2時間 3時間から4時間
 - その他 _____

Appendix 3









MULTIPLE INTELLIGENCES THEORY LEARNING STYLE QUESTIONNAIRE

For each of the statements below, give yourself a score from 1 to 5 according to the scale below. There are no right or wrong answers. Your score will reveal a profile of your Learning Style in terms of Multiple Intelligences theory.

1 never 2 not much 3 a little 4 quite a lot 5 a lot

	My score		My score
1 I use pictures in my learning.	<input type="checkbox"/>	24 I need quiet and privacy if I am learning.	<input type="checkbox"/>
2 I write things down in order to remember them.	<input type="checkbox"/>	25 I discuss my classmates pets with them.	<input type="checkbox"/>
3 I believe I learn a lot from group work.	<input type="checkbox"/>	26 I like structured agendas for meetings at school.	<input type="checkbox"/>
4 I remember my classes by recalling how people (other students and myself) stood, sat or moved.	<input type="checkbox"/>	27 I like class activities in class where I can move around.	<input type="checkbox"/>
5 I prefer working independently to working in a group.	<input type="checkbox"/>	28 When I think of a class, I imagine where everyone sits.	<input type="checkbox"/>
6 I would describe myself as a planner.	<input type="checkbox"/>	29 I like learning outside the classroom.	<input type="checkbox"/>
7 I like to learn by discussing topics with others.	<input type="checkbox"/>	30 I like to work in groups.	<input type="checkbox"/>
8 I enjoy calculating my marks.	<input type="checkbox"/>	31 I discuss music with my classmates.	<input type="checkbox"/>
9 I like to write things down.	<input type="checkbox"/>	32 I like tasks where I can use my personal experiences.	<input type="checkbox"/>
10 I remember things using rhymes or rhythm.	<input type="checkbox"/>	33 I use diagrams and flow-charts to learn.	<input type="checkbox"/>
11 I use mind maps, tables and/or diagrams.	<input type="checkbox"/>	34 I often reflect on how I function with other students when we do group work.	<input type="checkbox"/>
12 I like to use environmental issues in my lessons.	<input type="checkbox"/>	35 I like to use poetry or literature in my learning.	<input type="checkbox"/>
13 I like to reflect on my own learning.	<input type="checkbox"/>	36 I am aware of other students as individuals in class.	<input type="checkbox"/>
14 I like using roleplay and/or drama.	<input type="checkbox"/>	37 I am aware of the group dynamics in my classes.	<input type="checkbox"/>
15 When I think back to a lesson, I imagine it as if I were watching television.	<input type="checkbox"/>	38 I am not embarrassed by physical contact with other s	<input type="checkbox"/>
16 I like to learn by moving physical objects (e.g. games, cards, props, tools).	<input type="checkbox"/>	39 I try to learn more about others musical interests.	<input type="checkbox"/>
17 It helps me if I put on background music when I study.	<input type="checkbox"/>	40 I enjoy class debates or discussions.	<input type="checkbox"/>
18 I like units in my coursebook which deal with natural phenomena (eg volcanoes, animals).	<input type="checkbox"/>	41 I enjoy discussing nature and environmental issues with classmates.	<input type="checkbox"/>
19 I reflect about what I am doing in my work.	<input type="checkbox"/>	42 I approach tasks in a logical way.	<input type="checkbox"/>
20 I am good at learning languages.	<input type="checkbox"/>	43 I prefer working in a group to working by myself.	<input type="checkbox"/>
21 I enjoy using films and video to learn.	<input type="checkbox"/>	44 I make visual material for my work.	<input type="checkbox"/>
22 I integrate music into my learning environment.	<input type="checkbox"/>	45 I like helping others plan and organize events.	<input type="checkbox"/>
23 I brainstorm ideas on paper.	<input type="checkbox"/>	46 I am aware of the weather outside my classroom.	<input type="checkbox"/>
		47 I like to write songs or stories.	<input type="checkbox"/>
		48 I rearrange the furniture in my room to my liking.	<input type="checkbox"/>

Add up your scores for each intelligence (using your logical-mathematical intelligence!).

Intelligence →	 Bodily-kinaesthetic	 Interpersonal	 Intrapersonal	 Linguistic	 Logical-mathematical	 Musical	 Naturalist	 Spatial
Statement ↓	4	3	5	2	6	10	12	1
	14	7	13	9	8	17	18	11
	16	30	19	20	26	22	25	15
	27	34	24	23	33	31	29	21
	38	37	32	35	42	39	41	28
	44	43	36	40	45	47	46	48
Total