What Do We Mean by Intelligence?

Introduction

In recent years, the development of our understanding of intelligence and learning has been influenced by the notion of *multiple intelligences*, *learning styles* and *learning preferences*.

As a teacher, I have distinct *learning styles* and *preferences* according to my own distinct intelligences or areas of ability. Each of my students, however, may have a different set of learning styles and preferences, according to his/her individual intelligences. Therefore it is necessary for a teacher to combine different types of stimulation and experiences for students in order to cater for a range of diverse learning styles present in the classroom. This is also useful when considering the range of abilities in the classroom.

This notion of multiple intelligence places less emphasis on the idea that intelligence is fixed or 'innate'. We all possess a range of abilities and have the ability to use these intelligences productively. This view of multiple intelligences is attributed to Gardner (1993). He believed that this approach would take into account the notion of individual difference.

Although each type of 'intelligence' can be viewed as distinct from the others, Gardner accepted that these intelligences do not work in isolation but are usually interactive and combine with other intelligences.

Gardner identified eight learning styles or preferences that would take account of individual differences.

1. **Verbal–linguistic intelligence**: This involves language processing and is used in reading, writing and understanding what people say.

2. **Logical–mathematical intelligence**: This is used in solving maths problems and is associated with deductive reasoning.

3. **Visual perceptual, spatial intelligence**: This is used in reading maps, for example, most visual learners report the ability to think in pictures.

4. **Musical–rhythmic intelligence**: This is used in playing an instrument, and shows a sensitivity to rhyme and rhythm.

5. **Bodily–kinaesthetic intelligence**: This is used in dancing, running and drama.

6. **Interpersonal intelligence**: This is used in relating to other people, for example in understanding another person's feelings or behaviour.

7. **Intrapersonal intelligence**: This is used to understand ourselves and how we can change ourselves (metacognition).

8. **Naturalist intelligence**: This is the ability to appreciate the natural world and to react emotionally to environmental factors, such as flowers, plants and animals.

This is not a definitive list – other abilities could be added to it, such as 'emotional intelligence' – there cannot be a limit on the human potential for independent abilities. As Gardner points out, every student has the potential for effective learning, but their learning strengths and preferences need to be accessed.

Ideas to Help Teachers Plan for their Learners' Strengths

It is important to consider that each student has his/her own distinct learning strengths or preferences. Below is a list of eight learning styles or preferences (adapted from Gardner's list (1993) by MacKay (2006)) which reflect a specific ability or 'intelligence' with a consideration of how an understanding of them can help the busy teacher.

• **Auditory–linguistic – 'word smart'**: These are traditional learners, often more suited to the 'talk and chalk' approach to teaching. Approximately 34 per cent of learners in a given class prefer this style (Tresman & Cooke, 2006). They can remember what they read and are able to explain it to others. This learning preference is most suited to written examinations and more traditional styles of teaching.

> **TIPS**
> All learners need a certain level of competence in this style, e.g. explaining ideas to others. Using peer tutoring opportunities will support this intelligence.

- **Logical–mathematical – 'number smart'**: These are usually step-by-step thinkers who prefer to learn within a logical structure. They are usually good at linear processing and problem-solving, and prefer to learn through aids such as flow charts.

  TIPS
  > All learners need to develop this ability as it complements all other styles. It can help to develop prediction and problem-solving skills. Practical experiments are very helpful with this preference.

- **Visual–perceptual – 'picture smart'**: These learners need to draw, illustrate, use diagrams and colour to learn effectively. Visual learners will describe how they 'think in pictures', in fact their brains prefer to visualise information in order to organise it and to aid recall.

  TIPS
  > Techniques such as highlighting, colour coding, using visuals and graphics are most effective for these learners. In fact, teaching the skill of concept mapping to organise new ideas and concepts will assist all learners not just those who are 'picture smart'.

- **Musical – 'rhyme and rhythm smart'**: Musical learners are sensitive to rhythm and rhyme and are influenced by the emotional content of their learning. Their early language work would have included a large component of rhyme and rhythm work.

  TIPS
  > This type of learning can be supported by asking learners to look for rhyme and rhythm in words and phrases, and to present new information in the form of a song, or even a 'rap'. The use of mnemonics with a strong beat to remember information is helpful and background music in time with the beating of the heart will help these students to remember the flow of blood through the chambers.

- **Kinaesthetic – 'body smart'**: These learners tend to remember what they do and so movement is very important for them. These learners could be the largest group in any given class.

  TIPS
  > Encourage students to use Post-it notes, flash cards and index cards, while processing as they learn. Movement during the class aids learning. Telling the learner to get up and walk round, e.g. when revising, will help them remember. These techniques also work for students with a learning difficulty.

- **Interpersonal – 'people smart'**: These learners are the 'social' learners who operate best while working with others, and are particularly effective when working in groups and teams.

> **TIPS**
>
> Co-operative learning groups, project work, teams, 'pair, share' activities and peer tutoring are all effective and will strengthen interpersonal skills for all learners.

- **Intrapersonal – 'self-smart' or 'intuitive'**: These learners are usually focused and motivated, and are aware of their own strengths and abilities, and have an inner drive. They are able to work independently and with persistence. They are intuitive learners and often prefer to be allowed to work in their own way.

> **TIPS**
>
> This is an important strength and has clear benefits for learning. It is helpful to give these learners time for individual reflection before moving into groups, and to encourage reflective learning by allowing students to come to group/class work with their own ideas worked out, this will enhance the group activity.

- **Emotional – 'I'm smart'**: Emotional intelligence is the most important ability for learners to have in order for them to feel secure and have a clear idea of their strengths and weaknesses. Positive self-esteem and inner strength seems to be a common attribute among these learners. Encouragement for effort and praise for each specific achievement helps to support this self-belief.

> **TIPS**
>
> Teachers can foster an optimistic and positive learning style by using praise and encouragement. In this way, students can operate from their comfort zone of past successes and move outwards to more challenging learning (MacKay, 2006).

The ideas presented in this book aim to extend second-level teachers' knowledge of practices which support inclusion. Practices which support peer learning, co-operative learning, active learning and problem-solving can be considered inclusive insofar as they address the diverse needs of all students.

The following table briefly summarises the key features of dyslexia, dyspraxia and ADHD. Classroom characteristics or teacher observations are also summarised.
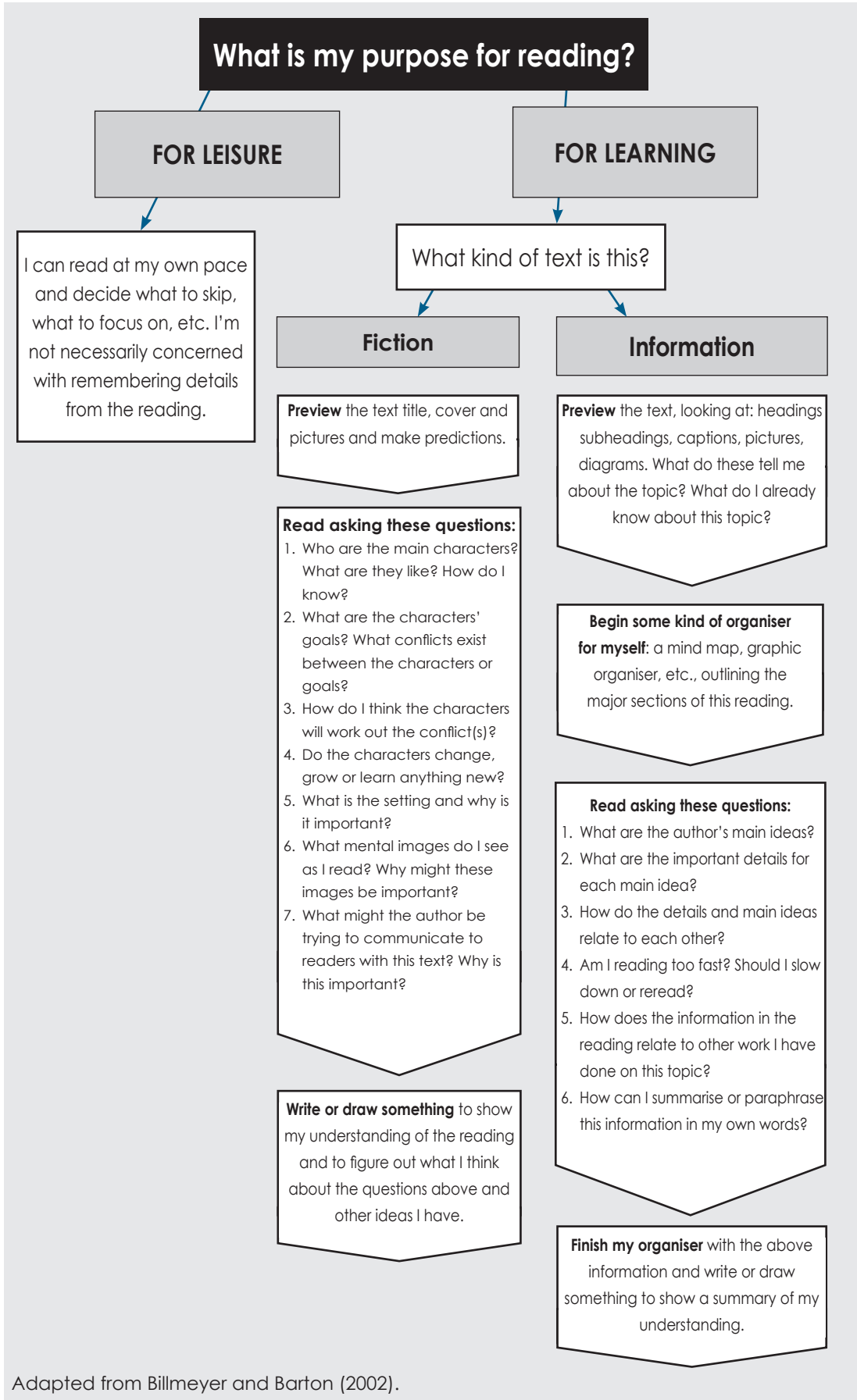
	Dyslexia	Dyspraxia	ADHD
Key features	• Phonological processing difficulties • Inefficient short-term and working memory difficulties • Lacking fluency, automatic word recognition, • Slow speed of processing • Organisational difficulties	• Late motor milestones • Gross and fine motor skill difficulties • Written presentation poor or illegible; poor letter formation • Oganisational difficulties	• Inattention • Distractability • Hyperactivity • Impulsivity
Teacher observations	• Hesitant reading • Unconventional spelling • Slow, laborious handwriting • Difficulties with concentration • Difficulties responding to instructions/to a continuous flow of information	• Hesitant reading • Slow, laborious handwriting; tight pencil grip; poor at drawing; clumsiness • Difficulties with concentration • Time lags evident in listening, speaking, doing, etc.	• Fails to pay attention • Doesn't listen when spoken to directly • Rarely completes tasks/activities • Easily distracted and forgetful • Fidgets • Interrupts or blurts out

Adapted from www.dyslexiaaction.org.uk.

> ### *How do you plan reading for your students?*
> ### *How would you describe your teaching style? (check the table below)*

The two approaches outlined below can be described as 'traditional' or 'student-centred'.

Traditional or 'old' approach	Student-centred or 'new' approach
Before reading	
Reading assignment given to students.	Pre-reading activities are used to establish prior knowledge, a purpose for reading and expected outcomes. For example, discussions, predictions, brainstorming, generating questions and gallery walks.
During reading	
Students read on their own and possibly answer text questions on their own. Students read with very little support. Teachers may read part of the text or students may read with little support.	Students read with a purpose in mind and use one or several methods for processing their understanding as they read.
After reading	
The teacher administers a test or discussion to see if students have learned the main concepts from the reading. Teachers are often frustrated by lack of comprehension, motivation, connection to text, etc.	Teacher facilitates activities to help students clarify, reinforce and build on their reading.

What is my purpose for reading?

FOR LEISURE

I can read at my own pace and decide what to skip, what to focus on, etc. I'm not necessarily concerned with remembering details from the reading.

FOR LEARNING

What kind of text is this?

Fiction

Preview the text title, cover and pictures and make predictions.

Read asking these questions:
1. Who are the main characters? What are they like? How do I know?
2. What are the characters' goals? What conflicts exist between the characters or goals?
3. How do I think the characters will work out the conflict(s)?
4. Do the characters change, grow or learn anything new?
5. What is the setting and why is it important?
6. What mental images do I see as I read? Why might these images be important?
7. What might the author be trying to communicate to readers with this text? Why is this important?

Write or draw something to show my understanding of the reading and to figure out what I think about the questions above and other ideas I have.

Information

Preview the text, looking at: headings subheadings, captions, pictures, diagrams. What do these tell me about the topic? What do I already know about this topic?

Begin some kind of organiser for myself: a mind map, graphic organiser, etc., outlining the major sections of this reading.

Read asking these questions:
1. What are the author's main ideas?
2. What are the important details for each main idea?
3. How do the details and main ideas relate to each other?
4. Am I reading too fast? Should I slow down or reread?
5. How does the information in the reading relate to other work I have done on this topic?
6. How can I summarise or paraphrase this information in my own words?

Finish my organiser with the above information and write or draw something to show a summary of my understanding.

Adapted from Billmeyer and Barton (2002).

The four posters below may help to identify good questions as you plan questions for narrative (fiction) texts.

Predicting

QUESTION TO THE TEACHER
What strategies will you use to help your students predict?

QUESTIONS TO THE STUDENT
What is your prediction for this passage? Use clues from the text or illustrations to predict what will happen next.

Clarifying

QUESTION TO THE TEACHER
What strategies/resources will you use to clarify parts of the text?

QUESTIONS TO THE STUDENT
What words, phrases, ideas do you need to clarify? Does it make sense? Does it sound right?

Summarising

QUESTION TO THE TEACHER
How will you help your students summarise?

QUESTIONS TO THE STUDENT
Write a summary for this passage. What are the main ideas?

Questioning

QUESTION TO THE TEACHER
What 'levels' of questions are you asking your students? Identify factual/recall, inferential and evaluative questions.

QUESTIONS TO THE STUDENT
Who? What? Why? When? Where? How? What if?

Adapted from Palinscar & Brown (1984).

The suggestions above illustrate how students can engage with fiction as they develop their thinking skills. The experience of reading literature is very different to reading non-fiction texts. Individual readers construct meaning from texts and different readers understand different things from the same text.

Planning group work and discussion

Whole class or small group discussion, debates and shared enquiry discussion among students provide opportunities for students to respond to literature in a variety of ways, which motivate and keep them engaged.

The teacher can guide the students through the writing process by following the stages outlined in the sample below.

Stages of writing	Activities to do with students
Introduction	Establish purpose for writing, context
Pre-writing	Free writing, brainstorm, debate, draw, visualise
Drafting	Just a first draft, allow ideas to flow
Reader response	Students get response from their audience – they need useful feedback on ideas and content
Revising	Time to rethink the writing, improve and clarify – several revisions may be needed
Editing	Proofreading: check for 'mechanics' – correct spelling, grammar and punctuation
Final draft	After final proofreading
Publishing	Sharing, class or public audience

Source: Adapted from Graves (1994), Calkins (1994) and Crain et al. (2002).

Starting to Write

Pre-writing

The teacher needs to give enough time to pre-writing so that students will be more relaxed about writing tasks if they know that this stage precedes every written assignment.

Encourage students to believe that they can write about something they know about, or something they are reading. You can practise this by doing the following:

- quick writing

- clustering (word associations), then do a 'quick write'

- listing all you know about a topic (order of importance)

- using examples of types of writing 'models'

- choosing your audience, purpose of writing and form (genre).

It is important to ensure that the language used is not ambiguous as this can increase the difficulty for students.

The following steps can help students to analyse the problem carefully and extract the relevant information. Visualising the problem in a creative way using images, such as LUVE 2 C U, can also help.

LUVE 2 C U	
1.	**L**ook carefully at the problem
2.	**U**nderline the key words
3.	**V**isualise the problem
4.	**E**stimate your answer
5.	**C**hoose the numbers to use
6.	**C**alculate the answer
7.	**Y**ou are great!

Teachers can also access the Junior Certificate School Programme (JCSP) Numeracy Strategy for resources such as strategy posters, theme posters and bookmarks for use in the classroom (see www.slss.ie, www.jcsp.ie and www.jcspliteracy.ie).

A similar problem-solving strategy using seven steps is called RAVE CCC. The word RAVE can be used to remember the first four steps (Westwood, 2002). Presenting the problem visually with a routine to follow will be more memorable for students:

RAVE CCC	
1.	**R**ead the problem carefully
2.	**A**ttend to the keywords that may suggest the process to use (e.g. share, less than, altogether)
3.	**V**isualise the problem (make diagram, sketch)
4.	**E**stimate possible answer
5.	**C**hoose the numbers to use
6.	**C**alculate the answer
7.	**C**heck against your estimate

Report

Writing frame

Topic: _____   Subject: _____

Date: _____   Name: _____

Before we began, we thought that _____

_____

However, I found out that _____

_____

I also found out that _____

_____

If I was investigating a topic like this again I would

_____

_____

A second example is _____

_____

A third example is _____

_____

_____

Explanation

Writing frame

Topic: _____ Subject: _____

Date: _____ Name: _____

I want to explain why _____

_____

_____

The main reason is _____

_____

_____

Another reason is _____

_____

_____

A further reason is _____

_____

_____

It's also thought that _____

_____

_____