Julian Beever, reproduced with permission.
Julian Beever
Julian Beever
"I observed to my delight that I could visualise with the greatest facility. I needed no models, drawings or experiments. I could picture them all as real in my mind."

Tesla (1919)
Nikola Tesla

www.kurasc.kyoto-u.ac.jp

http://www.neuronet.pitt.edu
Visual Spatial Giftedness
At School and Home
Visual Spatial Giftedness
At School and Home

1. Theoretical history
2. Cognitive skills and behaviours
3. Identification
4. Principles for differentiation
5. Learning strategies
6. Strategies for home
THEORY: Visual Spatial Construct

1924 L. L. Thurston
Existence and independence of spatial ability

1927 Truman Kelly
Sense and retain geometric forms, mental manipulation

1935 A. A. H. El-Koussy
Distinguished between 2D and 3D aptitude

1983 H. Gardner
Multiple Intelligence Theory: Spatial Intelligence

1982 Silverman
Visual Spatial Learner Construct

(Gardner, 1983; Silverman, 2000)
Baddeley’s theory of Working Memory

**phonological loop**
manages verbal material

**visuospatial sketchpad**
processes visual spatial material

**central executive**
regulates the two

Operate independently from each other

(Baddeley, 2003)
Visual Spatial: Areas of aptitude

- Colour
- Tone
- Texture
- 2D pattern
- 3D form and space
- Structure
- Movement: present and potential
- Context: spatial and temporal
- Application of skills to practical/social ends
- Creativity- innovative composition

(Parkinson & Edwards, 1993)
Visual Spatial: Cognitive Behaviors

- Spatial as opposed to sequential thinking
- Synthesis of ideas
- Intuitive grasp of complex systems
- Inductive reasoning
- Thinks primarily in pictures
- Thinking is fast, complex and non-sequential
- Use of imagination, visualisation to combine existing facts in new ways
- Can provide models, abstract visual memory

(Parkinson & Edwards, 1993)
Visual Spatial Affective Behaviours

- Reflective thinking = day dreaming / off task
- Heightened sensitivity
- Can ‘read’ people easily
- Disorganised, messy
- Little sense of time
- Confusion and frustration
- Perfectionism / Avoidance
- Introverted / unassuming

(Mann, 2001; Silverman & Freed, 1996; Lubinski, 2003)
Two types of gifted V-S student:

Usually identified as gifted:
- Normal pattern of development.
- Left hemisphere more developed than right.
- May be achieving at a high level in many areas.

Often not identified as gifted:
- Asynchronous development.
- Right hemisphere more developed than normal.
- May struggle with left hemisphere processes - reading, writing, sequences.
## Observable behaviours

<table>
<thead>
<tr>
<th>Characteristics of visual spatial giftedness</th>
<th>May also display these behaviours if development is asynchronous.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grasps relationships between systems</td>
<td>Has difficulty grasping isolated details</td>
</tr>
<tr>
<td>Excels with complex, higher level content</td>
<td>Struggles with easy or basic content</td>
</tr>
<tr>
<td>Is reflective</td>
<td>May be seen as a daydreamer</td>
</tr>
<tr>
<td>Has excellent memory for specific information</td>
<td>Has difficulty with rote memorisation</td>
</tr>
<tr>
<td>Is preoccupied with ideas</td>
<td>Possesses weak social skills</td>
</tr>
<tr>
<td>Is able to manipulate visual images</td>
<td>Processes verbal communication slowly</td>
</tr>
<tr>
<td>Exhibits creative talent</td>
<td>Struggles in traditional academic settings</td>
</tr>
<tr>
<td>Excels at mathematical concepts</td>
<td>Has poor computational skills</td>
</tr>
<tr>
<td>Uses metaphorical language effectively</td>
<td>Rarely uses concise descriptions in language</td>
</tr>
<tr>
<td>Has strong reading comprehension skills</td>
<td>Has weak reading decoding skills</td>
</tr>
<tr>
<td>Is aware of physical properties and patterns</td>
<td>Is slow to process conventional understandings</td>
</tr>
<tr>
<td>Possesses a vivid imagination</td>
<td>Has difficulty putting stories into written form</td>
</tr>
</tbody>
</table>

(Dixon, 1983; Silverman, 2002; West, 1997 cited in Mann, 2005b)
IDENTIFICATION

"I think he may be visual-spatial!

Ya think?"
IDENTIFICATION

Psychometric Tests:

- Stanford Binet – high visual spatial score
- Spatial Ability Tests - John Hopkins University
- WISC – Wechsler Intelligence Scale for Children

(Silverman, 2002; Stumpf & Eliot, 1999)
WISC-III Indicators

- Block design of 17 or more

- Or two out of three indicators:
  1. Performance IQ 130 or above + surpasses verbal IQ
  2. Block design of 17 or more
  3. Perceptual organisation index 130 or above

(Silverman, 2000)
WISC: ‘visual spatial scatter’
Classroom Observation: Best Indicators

Student interests:
- build create, manipulate shape, and transform materials and objects
- artwork, assembling, building, cooking, designing, drawing, gardening, inventing, painting, repairing
- construction toys: lego, connex, kileek, mobilo, blocks
- puzzles, jigsaws and mazes
- moving through space: art, drama, music, dance
- constructing computer programs or scientific experiments
- at school: architecture, computers, technology, arts, physical science

Parent’s careers and interests

Ear infections, ≥ 8 in first three years

Early development

(Silverman, 2002; Lubinski, 2003; Sword, 1997)
Careers that utilise V-S giftedness:

- Sculptor
- Artist
- Innovative scientist
- Architecture
- Photography
- Inventor
- Chemistry
- Computer science
- Aeronautics
- Engineering
- Electrical engineering
- CEO
- Surrogate
- Pure mathematical research
- Carpenter
- Cartography
- Interpreting MRI and x-rays
- Business owner
- Physics

http://www.ims.tuwien.ac.at/research/construct3d/
Classroom Observation: Best Indicators

Student interests:
- build create, manipulate shape, and transform materials and objects
- artwork, assembling, building, cooking, designing, drawing, gardening, inventing, painting, repairing
- construction toys: lego, connex, kileek, mobilo, blocks
- puzzles, jigsaws and mazes
- creative endeavours like art, drama, music, dance
- constructing computer programs or scientific experiments
- at school: architecture, computers, technology, arts, physical science

Parent’s careers and interests

Ear infections, ≥ 8 in first three years

Early development

(Silverman, 2002; Lubinski, 2003; Sword, 1997)
Rating scales and questionnaires

- **Silverman** - observer and student rating scales
  - [www.visualspatial.org/VSI/rating.pdf](http://www.visualspatial.org/VSI/rating.pdf)
  - [www.visualspatial.org/VSI/vsieng.pdf](http://www.visualspatial.org/VSI/vsieng.pdf)

- **Mann** - student questionnaire
  - [www.gifted.uconn.edu/siegle/Dissertations/Rebecca%20Mann.pdf](http://www.gifted.uconn.edu/siegle/Dissertations/Rebecca%20Mann.pdf)

- **Sword** - identifier checklist
AT SCHOOL

- 5 key principles for differentiation:
  1. Collaboration
  2. Support
  3. Complexity
  4. Visual-spatial media
  5. Life long learning

- Learning strategies
1. Collaboration

- Role of teacher
- Reciprocal relationship with parents and child
- Support from colleagues

Program relates to student’s strengths, interests, learning style, motivation and supports any weaknesses

(Ministry of Education, 2000; Riley, 2001)
2. Support

- **Study Skills**: sequential processing, time management
- **Intra-personal Skills**: self-understanding, emotional needs
- **Inter-personal Skills**: social needs, grouping
- **Teacher access and provision of support.**

(McFarlane, 2000; Stewart, 2003; Sturgess, 1999; Delisle and Galbraith, 2002)
3. Complexity

- **Content:** Broad based themes, complex systems, real life problems.

- **Process:** Introduce whole idea in all its complexity at the beginning. Field trip, speaker, interview, video. Use mapping and visual media.

- **Product:** Multiple solutions. Obscure, novel and unique ideas and systems. Practical inventions.

- **Presentation:** Multimedia, visual, graphic, design, arts, movement. Authentic audience.

- **Higher order thinking:** Holistic, simultaneous.

- **Challenge:** Individualised, requires risk taking and effort.

*(Golon, 2006; Mann, 2001; Silverman, 2002; Gallagher, 2005; Renzulli & Reis, 1997)*
4. Visual- spatial media

<table>
<thead>
<tr>
<th>Real life</th>
<th>visits, hands on, materials, processes, machinery, conversations, problems.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2D</td>
<td>graphic organisers, computer programs, video, websites, animation, visual art.</td>
</tr>
<tr>
<td>3D</td>
<td>materials, clay, models, diorama, invention construction, prototype, deconstruction.</td>
</tr>
<tr>
<td>Movement</td>
<td>drama, music, demonstrating, creating, experimenting.</td>
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<tr>
<td>through space</td>
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</tbody>
</table>

Content, Process and Product.

(Davis, 1994; Mann, 2005; Silverman, 2002; Sword, 1997; Turner, 2003; West, 1997)
5. Life long learning

- Engaging
- Enjoyable
- Intrinsic Motivation
- Challenging
- Builds skill base
- Develops independence
- Confidence
- Love of learning

(Gallagher, 2005; Tomlinson, 1999)
Relationship of principles to the Enrichment Triad:

1. Collaboration

2. Support

3. Complexity

4. Visual-spatial media

5. Life long learning

(TYPE I
  GENERAL EXPLORATORY ACTIVITIES

TYPE II
  GROUP TRAINING ACTIVITIES

TYPE III
  INDIVIDUAL & SMALL GROUP INVESTIGATIONS OF REAL PROBLEMS

(RENZULLI & REIS, 1997, REPRINTED AND ADAPTED WITH PERMISSION BY JOY, 2006)
## Visual Spatial Learning Strategies

<table>
<thead>
<tr>
<th>Resources</th>
<th>Colour, size, and images</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading</td>
<td>Graphic novels, Manga</td>
</tr>
<tr>
<td>Printing</td>
<td>Keyboard or linked writing instead</td>
</tr>
<tr>
<td>Spelling</td>
<td>Visualisation strategies</td>
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<tr>
<td>Timestables</td>
<td>Wall pictures</td>
</tr>
<tr>
<td>Notetaking</td>
<td>Pictures, tape recording</td>
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<tr>
<td>Essay org.</td>
<td>Graphic organisers, colour codes</td>
</tr>
<tr>
<td>Show steps</td>
<td>Work backwards</td>
</tr>
<tr>
<td>Memory</td>
<td>Music, Mnemonics, Metaphors, Fantasy</td>
</tr>
<tr>
<td>Focus</td>
<td>Allow doodling, walking, tactile objects</td>
</tr>
</tbody>
</table>

(Golon, 2006)
3 \times 8 = 24 \iff 8 \times 3 = 24
Mmm yum!

Yum

6 x 3 = 18

3 x 6 = 18
AT HOME

- List / flowchart routines
- Break it down - the hoola-hoop
- Match images of desired result
- Visualising consequences promotes action
- Basic commands, one at a time
- Observe a new skill before trying
- Support school learning with visual techniques
- Follow passions after school

(Golon, 2004)
Morning:
Shower
Deodorant
Teeth
Piercing
Supplements
Bed and curtains
Light
Make lunch
ph34r t3h cute ones.

Evning
Dishes
5 min tidyup
teeth
Floss
Flouride
Piercing
Supplements
Morning Jobs
Teeth
Bed and Curtains
Deodorant
Shower
Teen Multi
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<th>20c/job</th>
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<td>Tidy room</td>
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<td>Floss</td>
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<td>Wash face</td>
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<td>Make dinner Monday night</td>
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</tr>
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(Golon, 2004)
● Acceptance and understanding!

References


Delisle, J., and Galbraith, J. (2002). *Gifted Kids don't have all the answers: How to meet their social and emotional needs*. USA: Free spirit publishing.


References


References

