

Guilford's Theory of Structure of Intellect Model (SI Model)

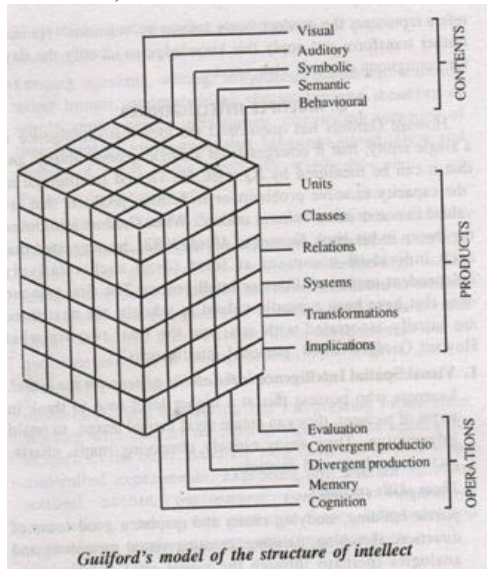
J. P Guilford (1961) developed the structure of intellect model on the basis of the factor analysis, He suggested every mental process or intellectual activity can be described in terms of three basic dimensions or parameters.

Such as **Operation, Content, Production**

He argued that intelligence consisted 150 different and independent skills.

Each of these intellectual abilities or structures is interlinked.

Therefore, he thinks $5 \times 5 \times 6 = 150$ intellectual abilities, which are presented below:



Intellectual abilities are placed under three broad categories

- **Operation - 6**

Cognition: Individual is able to recognize thing.

Memory of Reading: Ability to recall or retrieve learned information

Memory of Retention:

Divergent production: Analyse - we think in different directions searching and seeking for some variety and novelty. It closely associated with creativity. General to Specific

Convergent Production: **Synthesize** it is generation of information conventionally accepted and it determines the response.

Evaluation: reaching decision making or judgments

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Visual : it is a concrete material, which has been perceived through the eyes.

Auditory : it consists of the matters or information perceived through ears.

Symbolic: it is composed of letters, digits and other conventional signs.

Semantic: it is the form of clear-cut verbal meaning or ideas for which no examples are necessary

Behavioural: Social intelligence which enables one to understand human communications.

- **Products**

Unit: To grasp sensory perception in to their uniqueness.

Classes: The ability to categorize ideas.

Relations: The ability to understand, the relations between or among existing things.

Systems: the ability group ideas or problems into space or the ability to structure problems for solutions.

Transformation: the ability to produce the future shape of a certain object situation under a certain circumstances.

Implications: The ability to understand the implied meanings.

Education Implication of SI Model

- Helpful for constructing various type of Intelligence test suitable to different age group
- Study individual difference in society
- Discovered many mental ability which were not known before
- Vocational testing

Example:

VCU	VCC	VCR	VCR	VCT	VCI
ACU	ACC	ACR	ACS	ACT	ACI
SCU	SCC	SCR	SCS	SCT	SCI
SCU	SCC	SCR	SCS	SCT	SCI
BCU	BCC	BCR	BCS	BCT	BCI

1. VCU (Visual Cognition Unit) – Child Sees the letter “A”
2. ACU (Auditory Cognition Unit) – Listens to the pronunciation of A
3. SCU (Symbolic Cognition Unit) – Relates A with Apple-Size,Shape,Sound,Colour
4. SCU (Semantic Cognition Unit) – Represents taste,price, where does it grow etc.,
5. BCU (Behavioural Cognition Unit) – When responses to behaviour (Stiulus)

What is Apple? – Fruit

What its Colour?

Multiple Intelligences by Gardner



Howard Gardner of Harvard has identified seven distinct intelligences. This theory has emerged from recent cognitive research and "documents the extent to which students possess different kinds of minds and therefore learn, remember, perform, and understand in different ways," according to Gardner (1991). According to this theory, "we are all able to know the world through language, logical-mathematical analysis, spatial representation, musical thinking, the use of the body to solve problems or to make things, an understanding of other individuals, and an understanding of ourselves. Where individuals differ is in the strength of these intelligences - the so-called profile of intelligences -and in the ways in which such intelligences are invoked and combined to carry out different tasks, solve diverse problems, and progress in various domains."

Gardner says that these differences "challenge an educational system that assumes that everyone can learn the same materials in the same way and that a uniform, universal measure suffices to test student learning. Indeed, as currently constituted, our educational system is heavily biased toward linguistic modes of instruction and assessment and, to a somewhat lesser degree, toward logical-quantitative modes as well." Gardner argues that "a contrasting set of assumptions is more likely to be educationally effective. Students learn in ways that are identifiably distinctive. The broad spectrum of students - and perhaps the society as a whole - would be better served if disciplines could be presented in a numbers of ways and learning could be assessed through a variety of means." The learning styles are as follows:

Visual-Spatial - think in terms of physical space, as do architects and sailors. Very aware of their environments. They like to draw, do jigsaw puzzles, read maps, daydream. They can be taught through drawings, verbal and physical imagery. Tools include models, graphics, charts, photographs, drawings, 3-D modeling, video, videoconferencing, television, multimedia, texts with pictures/charts/graphs.

Bodily-kinesthetic - use the body effectively, like a dancer or a surgeon. Keen sense of body awareness. They like movement, making things, touching. They communicate well through body language and be taught through physical activity, hands-on learning, acting out, role playing. Tools include equipment and real objects.

Musical - show sensitivity to rhythm and sound. They love music, but they are also sensitive to sounds in their environments. They may study better with music in the background. They can be taught by turning lessons into lyrics, speaking rhythmically, tapping out time. Tools include musical instruments, music, radio, stereo, CD-ROM, multimedia.

Interpersonal - understanding, interacting with others. These students learn through interaction. They have many friends, empathy for others, street smarts. They can be taught through group activities, seminars, dialogues. Tools include the telephone, audio conferencing, time and attention from the instructor, video conferencing, writing, computer conferencing, E-mail.

Intrapersonal - understanding one's own interests, goals. These learners tend to shy away from others. They're in tune with their inner feelings; they have wisdom, intuition and motivation, as well as a strong will, confidence and opinions. They can be taught through

independent study and introspection. Tools include books, creative materials, diaries, privacy and time. They are the most independent of the learners.

Linguistic - using words effectively. These learners have highly developed auditory skills and often think in words. They like reading, playing word games, making up poetry or stories. They can be taught by encouraging them to say and see words, read books together. Tools include computers, games, multimedia, books, tape recorders, and lecture.

Logical -Mathematical - reasoning, calculating. Think conceptually, abstractly and are able to see and explore patterns and relationships. They like to experiment, solve puzzles, ask cosmic questions. They can be taught through logic games, investigations, mysteries. They need to learn and form concepts before they can deal with details.

At first, it may seem impossible to teach to all learning styles. However, as we move into using a mix of media or multimedia, it becomes easier. As we understand learning styles, it becomes apparent why multimedia appeals to learners and why a mix of media is more effective. It satisfies the many types of learning preferences that one person may embody or that a class embodies. A review of the literature shows that a variety of decisions must be made when choosing media that is appropriate to learning style.

Visuals: Visual media help students acquire concrete concepts, such as object identification, spatial relationship, or motor skills where words alone are inefficient.

Printed words: There is disagreement about audio's superiority to print for affective objectives; several models do not recommend verbal sound if it is not part of the task to be learned.

Sound: A distinction is drawn between verbal sound and non-verbal sound such as music. Sound media are necessary to present a stimulus for recall or sound recognition. Audio narration is recommended for poor readers.

Motion: Models force decisions among still, limited movement, and full movement visuals. Motion is used to depict human performance so that learners can copy the movement. Several models assert that motion may be unnecessary and provides decision aid questions based upon objectives. Visual media which portray motion are best to show psychomotor or cognitive domain expectations by showing the skill as a model against which students can measure their performance.

Color: Decisions on color display are required if an object's color is relevant to what is being learned.

Realia: Realia are tangible, real objects which are not models and are useful to teach motor and cognitive skills involving unfamiliar objects. Realia are appropriate for use with individuals or groups and may be situation based. Realia may be used to present information realistically but it may be equally important that the presentation corresponds with the way learner's represent information internally.

Instructional Setting: Design should cover whether the materials are to be used in a home or instructional setting and consider the size what is to be learned. Print instruction should be delivered in an individualized mode which allows the learner to set the learning pace. The

ability to provide corrective feedback for individual learners is important but any medium can provide corrective feedback by stating the correct answer to allow comparison of the two answers.

Learner Characteristics: Most models consider learner characteristics as media may be differentially effective for different learners. Although research has had limited success in identifying the media most suitable for types of learners several models are based on this method.

Reading ability: Pictures facilitate learning for poor readers who benefit more from speaking than from writing because they understand spoken words; self-directed good readers can control the pace; and print allows easier review.

Categories of Learning Outcomes: Categories ranged from three to eleven and most include some or all of Gagne's (1977) learning categories; intellectual skills, verbal information, motor skills, attitudes, and cognitive strategies. Several models suggest a procedure which categorizes learning outcomes, plans instructional events to teach objectives, identifies the type of stimuli to present events, and media capable of presenting the stimuli.

Events of Instruction: The external events which support internal learning processes are called events of instruction. The events of instruction are planned before selecting the media to present it.

Performance: Many models discuss eliciting performance where the student practices the task which sets the stage for reinforcement. Several models indicate that the elicited performance should be categorized by type; overt, covert, motor, verbal, constructed, and select. Media should be selected which is best able to elicit these responses and the response frequency. One model advocates a behavioral approach so that media is chosen to elicit responses for practice. To provide feedback about the student's response, an interactive medium might be chosen, but any medium can provide feedback. Learner characteristics such as error proneness and anxiety should influence media selection.

Testing which traditionally is accomplished through print, may be handled by electronic media. Media are better able to assess learners' visual skills than are print media and can be used to assess learner performance in realistic situations.