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Learning Science and Mathematics

FACTORS OF EFFECTIVE LEARNING IN SCIENCE AND MATHEMATICS

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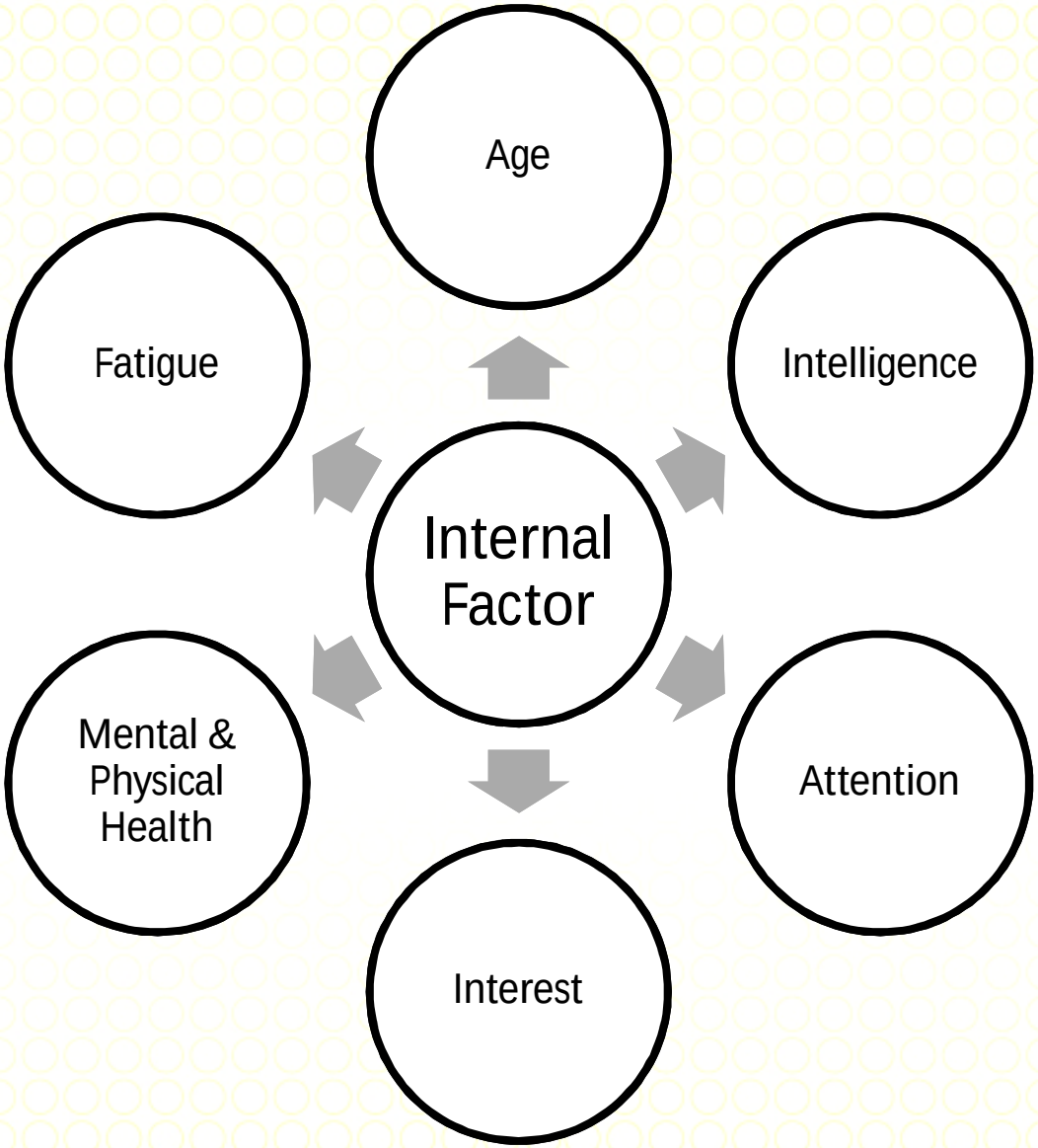
FACTORS THAT EFFECT LEARNING

Internal Factor

External Factor


Age
Fatigue
Intelligence
Internal Factor
Mental & Physical Health
Attention
Interest

Internal Factor

- 1.Age:
  Age can influence upon the capability of learning a child cam not learn the things what elders can learn and an aged person will have difficulty to learn modern ways of knowledge. Internal factors influence learning as ell ad external one. Internal factors are also called subjective factors influence in learning.

Internal Factor

- 2. Intelligence:
  Intelligence effects very much on learning, if subject/ individual has maximum level of intelligence he can learn more and easily at maximum level.

Internal Factor

- 3. Attention:
  Attention is also very important factor which influence on learning, of a person does not pay attention towards how to learn a specific knowledge, skill or experience, he can not learn easily bur if the individual pays attention the results are vise versa.

Internal Factor

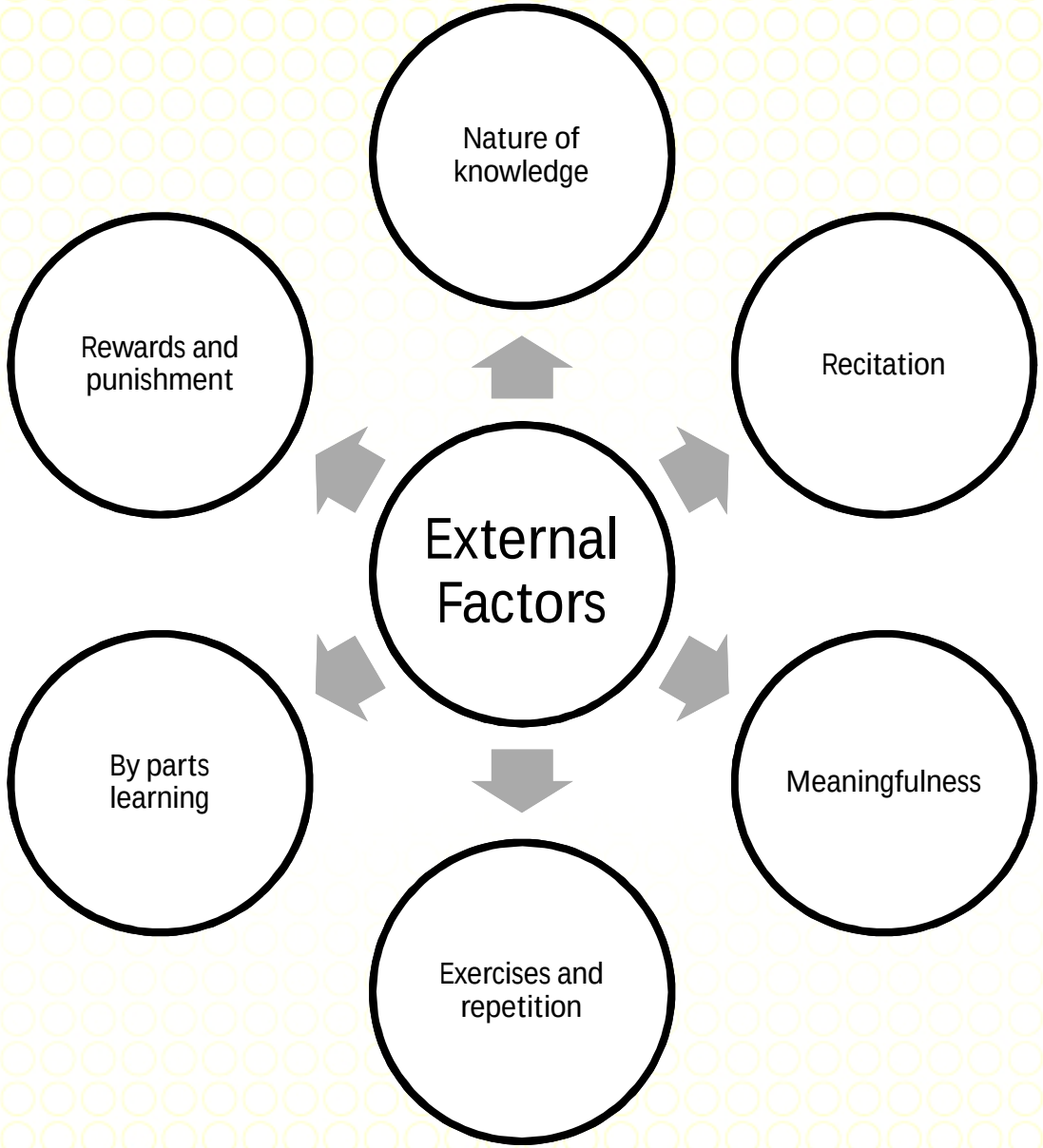
- 4. Interest:
  Subject has intelligence and can also pay attention towards learning but he does not have interest in how to learn a specific knowledge, skill or experience, level or process of learning would be very slow.

Internal Factor

- 6. Mental & physical health:
  Learning also depends upon mental and physical health of the individual or subject, if an individual does not have mental health or physical one, the subject can fulfill the demands of the process of learning due to his weak mental and physical capabilities.

Internal Factor

- 7. Fatigue:
  If an individual is tired, he cannot pay full attention towards learn something.


Nature of knowledge
Recitation
Meaningfulness
Exercises and repetition
By parts learning
Rewards and punishment
External Factors

External factors

- **1. Nature of knowledge**
  If knowledge is interesting in nature, any individual can learn it more efficiently.

External factors

- **2. Recitation**
  Recitation is more effective tool of learning, if an individual recite something louder he can learn more effectively.

External factors

- **3. Meaning fullness**
  If the material of knowledge is meaning full, the individual will learn it more effectively and easily, meaning less material nether can be learnt easily nor kept in memory on long term basis.

External factors

- **4. Exercise & repetition**
  Single act is learnt in single trial but complex acts require repeated trials. If a material is difficult to learn it can be learnt through exercises or repeated trials.

External factors

- **5. By parts learning**
  If the material is so long it can be divided into small parts, so individual can learn specific knowledge, skill etc more effectively.

External factors

- **6. Reward and punishment**
  The presence or absence of reward can affect learning, generally, reward is more effective in promoting learning than is punishment, the latter does have some effects on learning, it tends to repress a desired response then to extinguish it.

Factors hindering science and mathematics learning

Factors hindering science and mathematics learning

Theme	Factors, Problems and Challenges
Personality of the Teachers	-Weak academic background and content knowledge for teaching -Poor attitudes to science and mathematics, learners and teaching -Poor teaching methods and practices (mainly teacher centred, rote and chalk and talk), teaching geared towards passing examinations). Examination pressure -Few qualified teachers
Characteristics of the Pupils	-Negative attitudes toward science and mathematics -Individual differences -Home and socio-economic background - Inability to read and write -Absenteeism and dropouts

Factors hindering science and mathematics learning

Overcrowded classrooms	-Large class enrolment due to UPE -High pupil to teacher ratio -Inadequacy of teaching and learning materials and resources (textbooks) -Much workload for teachers
Nature of the Curriculum and Syllabus	-Overloaded curriculum (broad: Too much content to be covered) -A subjects-congested timetable and inadequate time to teach much content -Irrelevance of the science and mathematics content -Examination oriented

Factors hindering science and mathematics learning

Government Policies on Education	-Low teacher ceiling limits per school -Recommended teacher-pupil ratio of 1:55 (but in reality ration is one to over 80 pupils) -The policy on UPE has loopholes -The thematic curriculum has been introduced in an ad-hoc manner (technical, mathematical symbols, notation and language; and daily language) -Automatic promotion of pupils to next class
Learning environment and assessment methods	-Poor reading culture -Examination focussed assessment -Lack of external support outside the school -Unsuitable learning culture -Inadequate provision of infrastructure

Factors for effective learning in science and mathematics

Teaching practices

- Teaching practices are central to understanding what makes for effective teaching. Peterson's list of effective teaching practices included:
  1. a focus on meaning and understanding science and mathematics and on the learning task;
  2. encouragement of student autonomy, independence, self-direction and persistence in learning; and
  3. teaching of higher-level cognitive processes and strategies.
  4. organised approach to teaching, where material was taught until it was mastered.

Student learning activities

- Taks that are scientifically and mathematically challenging and significant: challenging so students will think

Engagement

- Student engagement, both its depth and extent, has come under scrutiny as a factor affecting
- argues that the classroom environment needs to be supportive of learning, and this entails engaging students (as well as setting high expectations, encouraging students to be self-regulating, and articulating the criteria for the quality of students' work).

Feedback

- Four attributes stood out as characteristics of effective teachers:
  1. Feedback: expert teachers provide timely and useful feedback (as distinct from praise) to enhance student learning;
  2. Challenge: expert teachers involve students in challenging tasks – challenging relative to the student's current level of achievement;
  3. Structure: expert teachers structure classroom activities to allow an increased probability that feedback will occur. They also structure activities that permit students to engage in challenging tasks; and
  4. Management: expert teachers are excellent managers of classrooms and they are able to engage and teach all students in the class, avoiding the temptation to 'teach to the middle'.