

# [The stages of learning](https://assignbuster.com/the-stages-of-learning/)

Stages of Learning and PracticeWhen people begin to practice a new motor skill and continue to practice, they typically progress through distinct, although continuous, stages of learning
-Learning a new skill can be related to solving a new movement problem
-All people go through distinct stages as they acquire new skills

Two models that describe these stages that occur during learning and practice: Fitt's and Posner model, and Gentile's model

Indicates that both he skill performer and the skill performance show distinct characteristics

Fitt's and Posner ModelProposes that the learner progresses through three stages when learning a motor skill along a continuum of practice time:

1) The Cognitive stage: The beginner engages in much cognitive activity such as problem solving, directing attention to movements, and so on

2) The Associative stage: In this intermediate stage the learner reduces amount of cognitive activity involved in performing the skill and works to refine the skill to increase performance success and consistency; learns how to chunk more accurately rather than focusing on specific movements

3) The autonomous stage: The learner performs skillfully, almost automatically, with little conscious attention conscious attention directed to the movements

Transitions between each stage occurs on a continuum ( of practice time) over an unspecified amount of practice/time, and performance improvement between each stage
- Depends on the particular skill, the practice conditions, and personal characteristics
- Gradual transition or change of the learner's characteristics from stage to stage

People who are learning a skill do not make abrupt shifts from one stage to the next, though qualitative leaps in performance are not uncommon within each stage (makes it difficult to know what stage an individual is in at a particular moment)

ONTHE STAGES OF LEARNING SPECIFICALLY FOR YOUFOR ONLY$13. 90/PAGEOrder NowCognitive StageThe first stage of learning in the Fitt's and Posner model during which the beginner focuses on cognitively oriented problems related to what to do and how to do a certain skill; stage in which the beginner engages in much cognitive activity such as problem solving, directing attention to movements, and so on

The performer focuses the most on learning the goals, objectives, and specific movements during this learning stage

Learner must also engage frequently with cognitive activity as he or she listens to instructions and receives feedback from an instructor

Performance is marked by numbers (large) errors and is highly variable (shows a lack of consistency from one attempt to the next)

Generally do not know what they need to do to improve, even if they are aware that they are doing something incorrectly

Associative StageIntermediate (second) stage of learning during which the learner reduces the amount of cognitive activity involved in performing the skill, and works to refine the skill to increase performance success and consistency

Cognitive activity changes, because the person now attempts to associate specific environmental cues with the movements required to achieve the goal of the skill

The performer makes fewer and smaller errors since ether have acquired the basic fundamentals or mechanics of the skill, although room for improvement is still available

Can be consider as a " refining" stage, where the person focuses on performing the skill successfully and more consistently with each attempt
-Performance variability decreases, and people acquire the capability to detect and identify some of their own performance errors

Autonomous StageThe third and final stage of learning during which the learner performs has learned to perform the skillfully, almost automatically, and with little conscious attention directed to the movements

The skill has become almost automatic, or habitual; people do not consciously think about their movements while performing the skill since they can perform it without conscious thought

Performer can also perform another task at the same time and can detect their own error sand make proper adjustments to them automatically

Performance variability is small, and performance dis consistent from one attempt to the next

Not every person learning a skill will tech this stage, as the quality of instruction and practice are important factors determining the achievement of the final stage

Gentile's Two Stage ModelViews motor skill learning as progressing through at least two stages from the perspective of the learner's goal of each stage: the initial stage and later stagesInitial StageThe goals of the beginner are to develop a movement coordination pattern that will allow some degree of successful performance (does not have to be consistent or efficient), and to learn to discriminate regulatory and non-regulatory conditions (those characteristics of the performance environment that have no influence or only indirect influence on movement characteristics to achieve an action goal) in the environmental context where the skill is to be performed

To do so, the beginner must:
- Develop movement characteristics that match the regulatory conditions of the environmental context in which the skill is performed through exploring a variety of movement possibilities and trial and error
- Solve numerous problems to determine how to achieve the action goal

The beginner develops a general concept of an effective approach, but the action-goal is not achieved consistently and movements lack efficiency

Later Stages of LearningGoal is to acquire 3 general characteristics:
1) The person must develop the capability of adapting the movement pattern to specific demands of any performance situation requiring that skill
2) The person must increase his or her consistency in achieving the goal of the skill
3) The person must learnt to perform the skill with an economy of effort

Movement goals are skill specific in this stage, as closed skills require a fixation of the movement pattern, whereas open skills require a diversification of the movement pattern

FixationClosed skills require fixation of the basic movement coordination pattern acquired during the first stage of learning; the learner's goal in the second stage of learning in Gentile's model for learning closed skills in which learners refine movement patterns so that they can produce them correctly, consistently, and efficiently from trial to trial

The learner works toward developing the capability to perform the movement pattern with little, if any conscious effort (automatically) and minimum physical energy

Practice of a closed skill during this stage should therefore give the learner the opportunity to " fixate" the required movement coordination pattern in such a way that he or she is capable of performing consistently

DiversificationOpen skills require diversification of the basic movement pattern acquired during the first stage of learning; the learner's goal in the second stage of Gentile's model for learning open skills in which learners acquire the capability to modify the movement pattern according to environmental context characteristics

As opposed to closed skills, open skills require the performer to quickly adapt to the continuously changing spatial and temporal regulatory conditions of the skill
- These conditions change within a performance trial, and between trials

Because of the demands of open skills, the learner must become more attuned to the regulatory conditions (be able to automatically monitor the environmental context), learn to anticipate changes in the environment before they occur, and acquire the capability to modify movements to meet their constantly changing demands on the performer accordingly

The practice of an open skill during this stage must provide the learner with experiences that will require these types of movement modifications

Regulatory ConditionsCharacteristics of the environmental context to which movement characteristics must conform to achieve the action goalClosed Skills vs Open SkillsClosed skills allow the learner to plan and prepare either without any or with minimum of time constraints

Open skills are limited by time constraints; reason why it is important for the learning of these skills to involve learning how to attend to regulatory conditions and anticipate changes

Bernsteins Description of the Learning ProcessBernstein described learning a new skill as solving a motor problem and compared the learning process to staging a play

Proposed that the learner progresses through multiple stages when acquiring a new skill and described effective practice as a form of repetition without repetition

Performer and Performance Changes Across the Stages of LearningIn each learning stage of stages-of-learning models, the person and the skill performance show distinct characteristics:

Changes in improvement (power law of practice)
Changes in movement coordination
Changes in how degrees of freedom are controlled (freezing degrees of freedom)
Changes in muscular energy cost
Changes in visual selective attention
Changes in conscious attention demands
Changing error detection and correction
Changes in brain activity: plasticity

Power Law of PracticeMathematical law describing the negatively accelerating change in rate of performance improvement during skill learning; large amounts of improvement that occur during early practice, and smaller improvement rates that characterize further practice (depicts the ogive curve)

The difference in rate of improvement between early and later practice is due partly to the amount of improvement possible at a given time
- Initially, a large amount of improvement can occur, since many of the large errors that occur early on are easy to correct
-As practice increases, the amount of improvement possible decreases (errors become much smaller and take more time to correct)

Changes in Movement Coordination: Freezing the Degrees of FreedomA common initial strategy of beginning learners to control the many degrees of freedom associated with the coordination demands of a motor skill (first stage of Gentile's model); the person holds some joints rigid (freezes them) and/or couples joint motions together in tight synchrony while performing the skill
-Done to simplify the movement initially

Identified by Burnstein as a strategy early learners use to control the degrees of freedom problem (3 stages)

As practice increases, a freeing of the degrees of freedom emerges as the " frozen" joints begin to become " unfrozen" and operate in a way that allows segments to function as a multisegment unit
-This new unit is functionally synergistic: segments can work together in a cooperative way to enable optimal performance of a skill (a dynamically stable and more economical coordination pattern emerges)

Implies that the observable change sin coordination represent changes in reorganization in the way movement is controlled

ex: prosthesis

Changes in How Degrees of Freedom are controlledNo correlation between the underlying complexity of the control mechanism as more degrees of freedom are releasedChanges in Altering an Old or Preferred Coordination PatternWhen confronted with learning a new skill, we often determine that it resembles a skill we already know how to perform; as a result, we typically begin practicing it with movement characteristics similar to skills that we already know (intrinsic dynamics)

These intrinsic dynamics, or initial coordination tendencies, and distinct pattern biases, must be overcome to achieve the goal of the new skill

It is possible to overcome these tendencies with practice

An observable pattern of stability and instability and then stability characterizes the transition between the preferred movement pattern and the production of the goal movement pattern

Intrinsic dynamics determine which patterns become more stable or less stable when new patterns are acquired

Changes in Visual Selective AttentionThe amount of visual information that one attends to decreases through practice (one becomes better at focusing only on specific cues of the environmental context)

The person gains an increased capability to direct his or her vision to the regulatory features in the environment that will provide the most useful info for performing the skill

People get better at appropriately directing their visual attention earlier during the time course of performing a skill

Changes in Conscious Attention Demands When Performing a SkillThe amount of conscious attention demanded by the movements of the skill itself decreases as he learner progresses along the stages of a learning continuum and becomes more skillful

Early in practice, the learner consciously thinks about almost every part of performing the skill (Fitts and Posner)

As the person practices and becomes more proficient, the amount of conscious attention directed towards performing the skill diminishes to the point where they are able to perform it almost automatically

Changes in Error Detection and Correction CapabilityCapability to identify and correct one's own movement errors increases through practice to improve performance during the attempt, or in future attempts (for rapid movements)

Important part of becoming skilled involves the rapid detection and efficient improvement in movement errors `

PlasticityChanges in neuronal activity in the brain that are associated with shifts in brain region activation; these changes are commonly associated with behavioral changes or modifications (the brain undergoes structural and functional changes through practice)

Specific brain regions activated during the initial stage of learning are not always the same areas activated during the later stages (initial: cerebellum, later: basal ganglia)

Processing efficiency also increases

Automatization of motor skills is associated with an overall reduction in cortical activity suggesting improvements in processing efficiency that are consistent with efficient gains in other systems during motor skill learning

ExpertiseRefers to high level of skill performance that characterizes a person at the extreme opposite end of the learning continuum from the beginner
- Typically the result of deliberate practice for a min of 10 years
- Have an activity-specific knowledge structure that is organized into more concepts related to performing that activity, and are better able to interrelate the concepts
- Experts who perform under extreme time constrains for decision making and anticipation are able to visually search the performance environment in a way that allows them to select more meaningful info in a short amount of time
- May resist allowing all aspects of their performance to becoming automated to enable continued improvements and adaptation to new situations