Medical Accounting

- **Fee for Service vs Value Based Care Payment Models**
  Fee for Service vs Value Based Care Payment Models How HCC Coding Affects Risk Adjustment Scores DRGs and Their Role in Hospital Reimbursement Medicare Advantage and Risk Adjustment Strategies Addressing Disparities in Reimbursement Rates Understanding ESRD Risk Adjustment Models The Impact of Chronic Conditions on Reimbursement Optimizing Documentation for Risk Adjustment Challenges in Bundled Payment Models Auditing Risk Adjustment Coding Accuracy State Variations in Medicaid Reimbursement Future of Reimbursement in Telehealth Services
- **Improving Charge Capture Processes in Healthcare**
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capture, the process by which healthcare providers ensure that they are appropriately reimbursed for their services, relies heavily on precise and thorough medical coding. This not only influences the financial health of a healthcare institution but also impacts patient care and overall operational efficiency.

First and foremost, accurate medical coding is crucial for maintaining financial stability within healthcare organizations. It supports continuity of care during staff transitions or leaves of absence **medical staffing** money. Given the intricate nature of modern medicine, with its vast array of procedures and treatments, precise coding ensures that every service rendered is accounted for and billed correctly. Missteps in this area can lead to significant revenue losses due to underbilling or claims denials from insurers. In essence, accurate coding acts as a safeguard against financial discrepancies that could potentially undermine an organization's ability to provide quality care.

Beyond financial implications, accurate medical coding also enhances compliance with regulatory standards. The healthcare industry is governed by stringent regulations designed to protect patient information and ensure ethical billing practices. Proper coding helps institutions adhere to these laws by ensuring transparency and accountability in billing practices. This not only avoids costly penalties but also builds trust with patients who expect integrity in how their personal health information is handled.

Moreover, precise medical coding contributes significantly to data accuracy and patient safety. Healthcare providers rely on coded data for various functions beyond billing; it informs clinical decision-making, supports research endeavors, and aids in public health tracking. Accurate codes ensure that all stakeholders have access to reliable information needed for effective decision-making processes. For instance, incorrect coding may result in inadequate treatment plans if clinicians rely on erroneous data about previous diagnoses or interventions.

To improve charge capture processes effectively, healthcare organizations must invest in continuous education and training for their staff involved in coding activities. Keeping abreast of updates to coding standards-such as those provided by ICD-10 or CPT-and understanding payer-specific guidelines are vital components of this educational effort. Additionally, leveraging technology solutions such as automated coding software can enhance accuracy while reducing manual errors associated with human oversight.

In conclusion, the importance of accurate medical coding within charge capture cannot be overstated. It serves as a pivotal element that ensures financial viability through proper reimbursement while safeguarding compliance with legal standards. Furthermore, its role extends beyond economics into areas critical for advancing patient care quality through reliable data usage across various facets of healthcare delivery systems. Therefore, optimizing charge capture processes begins with prioritizing precision at every step-from code assignment right through claim submission-to foster an environment where both organizational success and exemplary patient outcomes thrive hand-in-hand.

Key Differences Between Fee for Service and Value Based Care Payment Models —

In the complex world of healthcare, where precision and efficiency are paramount, charge capture processes play a crucial role in ensuring that healthcare facilities receive accurate compensation for the services they provide. However, like any intricate system, charge capture is fraught with challenges that can hinder its effectiveness and impact the financial health of an organization. Identifying and understanding these common challenges is the first step toward improving charge capture processes.

One of the most significant challenges in current charge capture processes is the sheer complexity of billing codes. With thousands of codes available to describe medical procedures, tests, and services, it is easy for errors to occur. These errors can result from incorrect code selection or failure to update codes as new procedures are developed or existing ones are modified. The constant evolution of coding systems necessitates continuous education and training for coding staff, which can be resource-intensive.

Another prevalent issue is incomplete documentation. Charge capture relies heavily on accurate and thorough documentation by healthcare providers. When documentation is lacking or unclear, it becomes nearly impossible to accurately translate patient care into billable charges. This challenge is exacerbated by time constraints faced by healthcare professionals who must balance patient care with administrative duties.

Moreover, discrepancies between clinical departments and billing departments often lead to missed charges or delayed processing. Communication gaps between these entities can result in information not being shared effectively or timely manner, leading to revenue leakage. Ensuring streamlined communication channels between clinical teams and billing staff is essential for minimizing these discrepancies.

Additionally, technological limitations pose a considerable obstacle in optimizing charge capture processes. Many healthcare organizations operate with outdated systems that do not integrate seamlessly with newer technologies or electronic health records (EHRs). This lack of interoperability can result in manual data entry errors and inefficiencies that slow down the entire billing process.

Finally, regulatory changes add another layer of complexity to charge capture processes. Healthcare regulations are constantly evolving at both state and federal levels, necessitating regular updates to compliance protocols within organizations. Keeping abreast of these changes requires dedicated resources and expertise which may not always be readily available within an organization.

Addressing these common challenges requires a multifaceted approach focused on education, technology enhancement, process improvement initiatives, and fostering better inter-departmental communication. By investing in comprehensive training programs for coding staff and leveraging advanced technology solutions such as automation tools or artificial intelligence-driven analytics platforms -healthcare organizations can enhance their charge capture accuracy significantly while also reducing administrative burdens on their workforce.

Ultimately improving charge capture processes means not only safeguarding revenue but also contributing towards delivering higher quality patient care by allowing clinicians more time for direct interactions rather than administrative tasks-thereby creating a win-win situation both financially for institutions involved as well operationally across all levels concerned within this critical sector industry today!

Impact of Fee for Service on Medical Coding Practices

The Role of Technology in Enhancing Charge Capture Efficiency

In the rapidly evolving landscape of healthcare, the challenge of improving charge capture processes is a pivotal concern for many organizations. Charge capture, the meticulous process of recording and billing every service provided to a patient, is essential not only for accurate reimbursement but also for maintaining financial health within healthcare institutions. The advent of technology has introduced transformative solutions that significantly enhance charge capture efficiency, proving indispensable in modernizing these processes.

One primary way technology bolsters charge capture is through the integration of Electronic Health Records (EHRs). EHR systems facilitate seamless documentation by automatically capturing data at the point of care. This reduces human error associated with manual entry and ensures that all billable services are accurately recorded. Moreover, EHRs enable real-time access to patient information and streamline communication among healthcare providers, which minimizes discrepancies and enhances coordination across different departments.

Another technological advancement contributing to improved charge capture is the use of sophisticated coding software. Medical coding can be complex due to constantly changing regulations and codes. Advanced coding software helps automate this intricate task by providing tools that assist in identifying appropriate codes swiftly and accurately. These systems often include features such as code validation checks and alerts for incomplete documentation, ensuring compliance with industry standards.

Mobile technology also plays a crucial role in enhancing charge capture efficiency. Mobile devices allow healthcare providers to document encounters at the bedside or on-the-go using specialized applications designed for quick data entry. This mobility ensures that charges are captured promptly, reducing delays and potential revenue loss associated with forgotten or delayed entries.

Artificial Intelligence (AI) and machine learning further revolutionize charge capture by offering predictive analytics capabilities. AI-driven systems analyze historical data to identify patterns and predict potential oversights or inaccuracies in billing processes. This proactive approach allows healthcare organizations to address issues before they result in claim denials or revenue shortfalls.

Moreover, automation technologies, such as robotic process automation (RPA), streamline repetitive tasks like claims submission and follow-up on unpaid bills. By automating these routine functions, staff can focus on more complex issues requiring human intervention, thereby increasing overall operational efficiency.

Despite its numerous benefits, embracing technology in charge capture processes requires careful implementation strategies. Training staff to effectively utilize new systems is crucial to harnessing their full potential while maintaining data privacy and security remains paramount in protecting sensitive patient information.

In conclusion, technology plays an integral role in enhancing charge capture efficiency within healthcare settings. From EHR integrations and advanced coding software to mobile applications and AI-driven analytics, technological innovations offer robust solutions that drive accuracy, speed, and compliance in capturing charges. As the healthcare industry continues to evolve, leveraging these technologies will be key to optimizing financial performance while ensuring high-quality patient care remains at the forefront of organizational priorities.

How Value Based Care Influences Medical Coding and Documentation Requirements

Accurate medical coding is a cornerstone of effective charge capture processes in healthcare. As the industry continues to evolve with new regulations, technologies, and treatments, maintaining precision in medical coding has never been more critical. It ensures that healthcare providers receive appropriate reimbursement for services rendered while also safeguarding against potential legal issues stemming from inaccurate billing practices. Implementing best practices for accurate medical coding can significantly enhance charge capture processes, ultimately improving financial health and operational efficiency within healthcare organizations.

One of the primary best practices is investing in continuous education and training for coding professionals. The landscape of medical coding is dynamic, with frequent updates to codes and guidelines. By providing ongoing training sessions and access to resources such as seminars, workshops, and online courses, healthcare organizations can ensure that their coders are well-versed in the latest changes. This not only improves accuracy but also boosts coder confidence and competence.

Another essential practice is leveraging technology to aid the coding process. Advanced software solutions equipped with artificial intelligence can assist coders by automatically suggesting codes based on documentation input. These tools can help reduce human error and speed up the coding process without compromising accuracy. However, it's crucial that these technological tools complement rather than replace human expertise; coders should always verify suggestions made by software to ensure they align with actual clinical documentation.

Furthermore, fostering a collaborative environment between clinical staff and coders can significantly enhance charge capture accuracy. When clinicians are aware of the importance of thorough documentation for accurate coding, they are more likely to provide detailed notes on patient encounters. Regular meetings or feedback sessions between these teams can help address any discrepancies or knowledge gaps regarding documentation requirements.

Implementing robust auditing mechanisms is another vital practice for ensuring accurate medical coding. Regular internal audits allow healthcare organizations to identify common errors or trends that may lead to inaccuracies in charge capture processes. By analyzing audit results, organizations can develop targeted interventions such as additional training or process improvements aimed at mitigating identified risks.

Lastly, maintaining open lines of communication with payers is important for staying informed about payer-specific rules and guidelines which might affect code selection or claim submission processes. Having clear channels for resolving disputes or clarifying uncertainties helps prevent claim denials due to misinterpretation of payer policies.

In conclusion, improving charge capture processes through accurate medical coding requires a multifaceted approach involving education, technology integration, collaboration between clinical staff and coders, rigorous auditing practices, and proactive communication with payers. By adhering to these best practices, healthcare organizations not only optimize their revenue cycle management but also contribute positively toward overall patient care quality by ensuring transparency in billing activities-ultimately driving sustainable growth within an ever-evolving industry landscape.

Challenges and Benefits of Transitioning from Fee for Service to Value Based Care in Medical Coding

In the ever-evolving landscape of healthcare, accuracy in medical coding and charge capture processes is paramount. The complexities inherent in these systems necessitate a robust framework for training and education among healthcare staff. By enhancing coding accuracy, we ensure that financial operations are streamlined, reimbursement processes are optimized, and ultimately, patient care is not compromised by administrative errors.

Accurate coding serves as the foundation of efficient charge capture processes. When healthcare professionals possess comprehensive knowledge and understanding of medical codes-ranging from ICD-10 to CPT codes-they can more reliably document patient encounters. This precision in documentation minimizes discrepancies that might lead to claim denials or delayed reimbursements. Moreover, with accurate coding, healthcare facilities can avoid potential penalties associated with regulatory non-compliance.

Training programs tailored specifically for healthcare staff play a crucial role in cultivating this expertise. Such programs must go beyond basic code memorization; they should encompass a deep dive into the nuances of medical diagnoses and procedures. Through workshops, seminars, and hands-on simulations, staff can learn to navigate complex cases where multiple conditions overlap or where new procedures emerge due to advances in medical technology.

Furthermore, continuous education is vital given the dynamic nature of medical billing regulations. Healthcare policies frequently change at both federal and state levels, necessitating an agile approach to education that includes regular updates on policy modifications and best practices in coding standards. By staying informed through ongoing training sessions or e-learning modules, healthcare professionals can maintain high standards of accuracy despite evolving challenges.

A collaborative environment also enhances learning outcomes significantly. Encouraging interaction between coders, clinicians, and administrative personnel fosters a culture of shared responsibility towards accurate documentation and billing practices. By working together to understand each other's roles better-clinicians providing detailed notes while coders translate them precisely into billable charges-healthcare teams can reduce errors significantly.

The benefits of improved charge capture processes extend beyond financial gains for the institution; they directly impact patient satisfaction as well. Patients appreciate transparency in billing practices which stems from accurate charge captures free from erroneous entries or unexplained costs. Clear communication about charges builds trust between patients and providers-a crucial component in today's patient-centered care model.

Investing time and resources into effective training programs for coding accuracy represents more than just an operational necessity; it signifies a commitment to excellence within healthcare services delivery systems globally. As we continue advancing technologically with electronic health records (EHRs) simplifying data management tasks-the human element remains irreplaceable when it comes down to ensuring every coded detail reflects real-world complexities accurately.

In conclusion, through dedicated training initiatives focused on improving coding accuracy among healthcare staff members-we pave the way toward more efficient charge capture processes that benefit all stakeholders involved-from administrators ensuring fiscal health sustainability upholding ethical standards-to patients receiving clear-cut service explanations fostering their trust continuously within our care frameworks globally poised today!

Case Studies Highlighting the Effects of Different Payment Models on Medical Coding Efficiency

In the ever-evolving landscape of healthcare, the accuracy and efficiency of charge capture processes play a crucial role in optimizing financial performance and ensuring compliance. Charge capture is the process by which healthcare providers record services rendered to patients for billing purposes. Monitoring and auditing these processes not only safeguard against revenue loss but also pave the way for continuous improvement, ultimately enhancing overall patient care.

Monitoring charge capture processes involves a systematic approach to tracking and evaluating how charges are recorded and processed. This step requires real-time data analysis and regular oversight to identify discrepancies or inefficiencies that might lead to revenue leakage. By implementing robust monitoring systems, healthcare organizations can promptly detect errors such as missed charges or incorrect coding, which can significantly impact financial outcomes.

On the other hand, auditing charge capture processes takes a more detailed approach by thoroughly examining historical records to ensure accuracy and compliance with established guidelines. Audits serve as a critical checkpoint where every aspect of the charge capture process is scrutinized, from initial patient documentation to final billing submission. Regular audits not only help in rectifying existing issues but also in identifying systemic flaws that could hinder future operations.

The intersection of monitoring and auditing creates a feedback loop that fosters continuous improvement within healthcare organizations. When discrepancies are identified through these processes, they provide invaluable insights into areas needing enhancement. For instance, recurring issues might highlight the need for additional staff training or improvements in electronic health record systems. Addressing these root causes effectively reduces error rates over time.

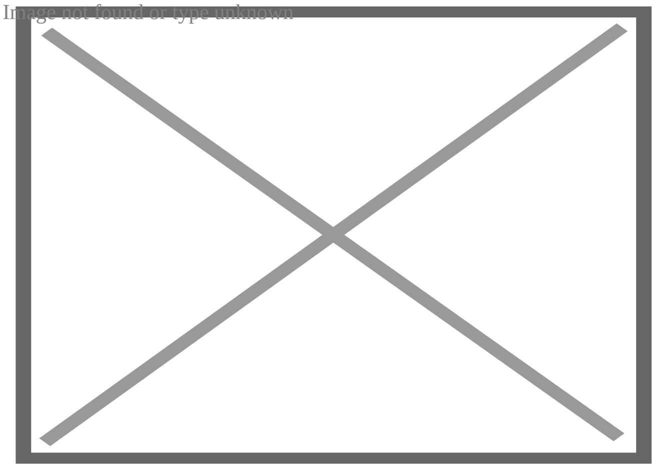
Moreover, integrating technology plays an indispensable role in refining charge capture processes. Advanced software solutions equipped with artificial intelligence capabilities can streamline both monitoring and auditing tasks by automating routine checks and flagging anomalies for further investigation. These technological advancements empower healthcare professionals to focus on delivering quality care while maintaining financial integrity.

However, it is essential to recognize that successful implementation of monitoring and auditing strategies demands a cultural shift within organizations towards transparency and accountability. Encouraging open communication among clinical staff, administrative personnel, and billing departments ensures that everyone is aligned with the goal of improving charge capture procedures.

In conclusion, monitoring and auditing charge capture processes are vital components of an effective strategy aimed at continuous improvement in healthcare settings. By diligently overseeing current operations while retrospectively analyzing past practices, organizations can minimize errors, enhance compliance, optimize revenues, and most importantly-improve patient care experiences. As technology continues to evolve alongside these practices, the potential for innovation within this realm remains boundless; thus securing sustainable growth for healthcare institutions worldwide.

About learning

For the album by Perfume Genius, see *Learning* (album).
Several terms redirect here. For other uses, see Learn (disambiguation), Learned (disambiguation), and Learners (film).



American students learning how to make and roll sushi

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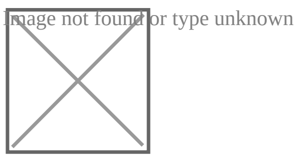
Cognitive psychology



Perception

- Visual
- Object recognition
- Face recognition
- Pattern recognition

Attention

Memory

- Aging
- Emotional
- Learning
- Long-term

Metacognition

Language

Metalanguage

Thinking

- Cognition
- Concept
- Reasoning
- Decision making
- Problem solving

Numerical cognition

- Numerosity adaptation effect
- Approximate number system
- Parallel individuation system

Learning is the process of acquiring new understanding, knowledge, behaviors, skills, values, attitudes, and preferences.[1] The ability to learn is possessed by humans, non-human animals, and some machines; there is also evidence for some kind of learning in certain plants.[2] Some learning is immediate, induced by a single event (e.g. being burned by a hot stove), but much skill and knowledge accumulate from repeated experiences.[3] The changes induced by learning often last a lifetime, and it is hard to distinguish learned material that seems to be "lost" from that which cannot be retrieved.[4]

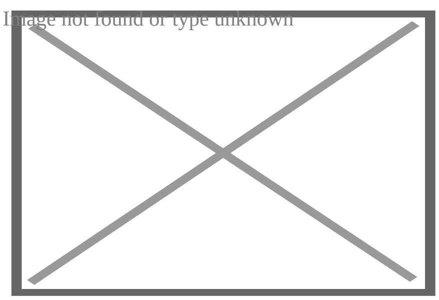
Human learning starts at birth (it might even start before[5]) and continues until death as a consequence of ongoing interactions between people and their environment. The nature and processes involved in learning are studied in many established fields (including educational psychology, neuropsychology, experimental psychology, cognitive sciences, and pedagogy), as well as emerging fields of knowledge (e.g. with a shared interest in the topic of learning from safety events such as incidents/accidents,[6] or in collaborative learning health systems[7]). Research in such fields has led to the identification of various sorts of learning. For example, learning may occur as a result of habituation, or classical conditioning, operant conditioning or as a result of more complex activities such as play, seen only in relatively intelligent animals.[8][9] Learning may occur consciously or without conscious awareness. Learning that an aversive event cannot be avoided or escaped may result in a condition called learned helplessness.[10] There is evidence for human behavioral learning prenatally, in which habituation has been observed as early as 32 weeks into gestation, indicating that the central nervous system is sufficiently developed and primed for learning and memory to occur very early on in development.[11]

Play has been approached by several theorists as a form of learning. Children experiment with the world, learn the rules, and learn to interact through play. Lev Vygotsky agrees that play is pivotal for children's development, since they make meaning of their environment through playing educational games. For Vygotsky, however, play is the first form of learning language and communication, and the stage where a child begins to understand rules and symbols.[12] This has led to a view that learning in organisms is always related to semiosis,[13] and is often associated with representational systems/activity.[14]

Types

[edit]
See also: Learning styles and Machine learning § Types of problems and tasks

There are various functional categorizations of memory which have developed. Some memory researchers distinguish memory based on the relationship between the stimuli involved (associative vs non-associative) or based to whether the content can be communicated through language (declarative/explicit vs procedural/implicit). Some of these categories can, in turn, be parsed into sub-types. For instance, declarative memory comprises both episodic and semantic memory.



Children learn to bike in the eighties in Czechoslovakia.

Non-associative learning

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Non-associative learning refers to "a relatively permanent change in the strength of response to a single stimulus due to repeated exposure to that stimulus."[15] This definition exempts the changes caused by sensory adaptation, fatigue, or injury.[16]

Non-associative learning can be divided into habituation and sensitization.

Habituation

[edit]

Main article: Habituation

Habituation is an example of non-associative learning in which one or more components of an innate response (e.g., response probability, response duration) to a stimulus diminishes when the stimulus is repeated. Thus, habituation must be distinguished from extinction, which is an associative process. In operant extinction, for example, a response declines because it is no longer followed by a reward. An example of habituation can be seen in small song birds—if a stuffed owl (or similar predator) is put into the cage, the birds initially react to it as though it were a real predator. Soon the birds react less, showing habituation. If another stuffed owl is introduced (or the same one removed and re-introduced), the birds react to it again as though it were a predator, demonstrating that it is only a very specific stimulus that is habituated to (namely, one particular unmoving owl in one place). The habituation process is faster for stimuli that occur at a high rather than for stimuli that occur at a low rate as well as for the weak and strong stimuli, respectively.[17] Habituation has been shown in essentially every species of animal, as well as the sensitive plant *Mimosa pudica*[18] and the large protozoan *Stentor coeruleus*.[19] This concept acts in direct opposition to sensitization.[17]

Sensitization

[edit]
Main article: Sensitization

Sensitization is an example of non-associative learning in which the progressive amplification of a response follows repeated administrations of a stimulus.[20] This is based on the notion that a defensive reflex to a stimulus such as withdrawal or escape becomes stronger after the exposure to a different harmful or threatening stimulus.[21] An everyday example of this mechanism is the repeated tonic stimulation of peripheral nerves that occurs if a person rubs their arm continuously. After a while, this stimulation creates a warm sensation that can eventually turn painful. This pain results from a progressively amplified synaptic response of the peripheral nerves. This sends a warning that the stimulation is harmful.[22][*clarification needed*] Sensitization is thought to underlie both adaptive as well as maladaptive learning processes in the organism.[23][*citation needed*]

Active learning

[edit]

Main article: Active learning

Active learning occurs when a person takes control of his/her learning experience. Since understanding information is the key aspect of learning, it is important for learners to recognize what they understand and what they do not. By doing so, they can monitor their own mastery of subjects. Active learning encourages learners to have an internal dialogue in which they verbalize understandings. This and other meta-cognitive strategies can be taught to a child over time. Studies within metacognition have proven the value in active learning, claiming that the learning is usually at a stronger level as a result.[24] In addition, learners have more incentive to learn when they have control over not only how they learn but also what they learn.[25] Active learning is a key characteristic of student-centered learning. Conversely, passive learning and direct instruction are characteristics of teacher-centered learning (or traditional education).

Associative learning

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Associative learning is the process by which a person or animal learns an association between two stimuli or events.[26] In classical conditioning, a previously neutral stimulus is repeatedly paired with a reflex-eliciting stimulus until eventually the neutral stimulus elicits a response on its own. In operant conditioning, a behavior that is reinforced or punished in the presence of a stimulus becomes more or less likely to occur in the presence of that stimulus.

Operant conditioning

[edit]
Main article: Operant conditioning

Operant conditioning is a way in which behavior can be shaped or modified according to the desires of the trainer or head individual. Operant conditioning uses the thought that living things seek pleasure and avoid pain, and that an animal or human can learn through receiving either reward or punishment at a specific time called trace conditioning. Trace conditioning is the small and ideal period of time between the subject performing the desired behavior, and receiving the positive reinforcement as a result of their performance. The reward needs to be given immediately after the completion of the wanted behavior.[27]

Operant conditioning is different from classical conditioning in that it shapes behavior not solely on bodily reflexes that occur naturally to a specific stimulus, but rather focuses on the shaping of wanted behavior that requires conscious thought, and ultimately requires learning.[28]

Punishment and reinforcement are the two principal ways in which operant conditioning occurs. Punishment is used to reduce unwanted behavior, and ultimately (from the learner's perspective) leads to avoidance of the punishment, not necessarily avoidance of the unwanted behavior. Punishment is not an appropriate way to increase wanted behavior for animals or humans. Punishment can be divided into two subcategories, positive punishment and negative punishment. Positive punishment is when an aversive aspect of life or thing is added to the subject, for this reason it is called positive punishment. For example, the parent spanking their child would be considered a positive punishment, because a spanking was added to the child. Negative punishment is considered the removal of something loved or desirable from the subject. For example, when a parent puts his child in time out, in reality, the child is losing the opportunity to be with friends, or to enjoy the freedom to do as he pleases. In this example, negative punishment is the removal of the child's desired rights to play with his friends etc.[29][30]

Reinforcement on the other hand is used to increase a wanted behavior either through negative reinforcement or positive reinforcement. Negative reinforcement is defined by removing an undesirable aspect of life, or thing. For example, a dog might learn to sit as the trainer scratches his ears, which ultimately is removing his itches (undesirable aspect). Positive reinforcement is defined by adding a desirable aspect of life or thing. For example, a dog might learn to sit if he receives a treat. In this example the treat was added to the dog's life.[29][30]

Classical conditioning

[edit]
Main article: Classical conditioning

The typical paradigm for *classical conditioning* involves repeatedly pairing an unconditioned stimulus (which unfailingly evokes a reflexive response) with another previously neutral stimulus (which does not normally evoke the response). Following conditioning, the response occurs both to the unconditioned stimulus and to the other, unrelated stimulus (now referred to as the "conditioned stimulus"). The response to the conditioned stimulus is termed a *conditioned response*. The classic example is Ivan Pavlov and his dogs.[21] Pavlov fed his dogs meat powder, which naturally made the dogs salivate—salivating is a reflexive response to the meat powder. Meat powder is the unconditioned stimulus (US) and the salivation is the unconditioned response

(UR). Pavlov rang a bell before presenting the meat powder. The first time Pavlov rang the bell, the neutral stimulus, the dogs did not salivate, but once he put the meat powder in their mouths they began to salivate. After numerous pairings of bell and food, the dogs learned that the bell signaled that food was about to come, and began to salivate when they heard the bell. Once this occurred, the bell became the conditioned stimulus (CS) and the salivation to the bell became the conditioned response (CR). Classical conditioning has been demonstrated in many species. For example, it is seen in honeybees, in the proboscis extension reflex paradigm.[31] It was recently also demonstrated in garden pea plants.[32]

Another influential person in the world of classical conditioning is John B. Watson. Watson's work was very influential and paved the way for B.F. Skinner's radical behaviorism. Watson's behaviorism (and philosophy of science) stood in direct contrast to Freud and other accounts based largely on introspection. Watson's view was that the introspective method was too subjective and that we should limit the study of human development to directly observable behaviors. In 1913, Watson published the article "Psychology as the Behaviorist Views", in which he argued that laboratory studies should serve psychology best as a science. Watson's most famous, and controversial, experiment was "Little Albert", where he demonstrated how psychologists can account for the learning of emotion through classical conditioning principles.

Observational learning

[edit]
Main article: Observational learning

Observational learning is learning that occurs through observing the behavior of others. It is a form of social learning which takes various forms, based on various processes. In humans, this form of learning seems to not need reinforcement to occur, but instead, requires a social model such as a parent, sibling, friend, or teacher with surroundings.

Imprinting

[edit]
Main article: Imprinting (psychology)

Imprinting is a kind of learning occurring at a particular life stage that is rapid and apparently independent of the consequences of behavior. In filial imprinting, young animals, particularly birds, form an association with another individual or in some cases, an object, that they respond to as they would to a parent. In 1935, the Austrian Zoologist Konrad Lorenz discovered that certain birds follow and form a bond if the object makes sounds.

Play

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Main article: Play (activity)

Play generally describes behavior with no particular end in itself, but that improves performance in similar future situations. This is seen in a wide variety of vertebrates besides humans, but is mostly limited to mammals and birds. Cats are known to play with a ball of string when young, which gives them experience with catching prey. Besides inanimate objects, animals may play with other members of their own species or other animals, such as orcas playing with seals they have caught. Play involves a significant cost to animals, such as increased vulnerability to predators and the risk of injury and possibly infection. It also consumes energy, so there must be significant benefits associated with play for it to have evolved. Play is generally seen in younger animals, suggesting a link with learning. However, it may also have other benefits not associated directly with learning, for example improving physical fitness.

Play, as it pertains to humans as a form of learning is central to a child's learning and development. Through play, children learn social skills such as sharing and collaboration. Children develop emotional skills such as learning to deal with the emotion of anger, through play activities. As a form of learning, play also facilitates the development of thinking and language skills in children.[33]

There are five types of play:

1. Sensorimotor play aka functional play, characterized by the repetition of an activity
2. Roleplay occurs starting at the age of three
3. Rule-based play where authoritative prescribed codes of conduct are primary
4. Construction play involves experimentation and building
5. Movement play aka physical play[33]

These five types of play are often intersecting. All types of play generate thinking and problem-solving skills in children. Children learn to think creatively when they learn through play.[34] Specific activities involved in each type of play change over time as humans progress through the lifespan. Play as a form of learning, can occur solitarily, or involve interacting with others.

Enculturation

[edit]
Main article: Enculturation

Enculturation is the process by which people learn values and behaviors that are appropriate or necessary in their surrounding culture.[35] Parents, other adults, and peers shape the individual's understanding of these values.[35] If successful, enculturation results in competence in the language, values, and rituals of the culture.[35] This is different from acculturation, where a person adopts the values and societal rules of a culture different from their native one.

Multiple examples of enculturation can be found cross-culturally. Collaborative practices in the Mazahua people have shown that participation in everyday interaction and later learning activities contributed to enculturation rooted in nonverbal social experience.[36] As the children participated in everyday activities, they learned the cultural significance of these interactions. The collaborative and helpful behaviors exhibited by Mexican and Mexican-heritage children is a cultural practice known as being "acomedido".[37] Chillihuani girls in Peru described themselves as weaving constantly, following behavior shown by the other adults.[38]

Episodic learning

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Episodic learning is a change in behavior that occurs as a result of an event.[39] For example, a fear of dogs that follows being bitten by a dog is episodic learning. Episodic learning is so named because events are recorded into episodic memory, which is one of the three forms of explicit learning and retrieval, along with perceptual memory and semantic memory.[40] Episodic memory remembers events and history that are embedded in experience and this is distinguished from semantic memory, which attempts to extract facts out of their experiential context[41] or – as some describe – a timeless organization of knowledge.[42] For instance, if a person remembers the Grand Canyon from a recent visit, it is an episodic memory. He would use semantic memory to answer someone who would ask him information such as where the Grand Canyon is. A study revealed that humans are very accurate in the recognition of episodic memory even without deliberate intention to memorize it.[43] This is said to indicate a very large storage capacity of the brain for things that people pay attention to.[43]

Multimedia learning

[edit]
Main article: Multimedia learning

Multimedia learning is where a person uses both auditory and visual stimuli to learn information.[44] This type of learning relies on dual-coding theory.[45]

E-learning and augmented learning

[edit]
Main article: Electronic learning

Electronic learning or e-learning is computer-enhanced learning. A specific and always more diffused e-learning is mobile learning (m-learning), which uses different mobile telecommunication equipment, such as cellular phones.

When a learner interacts with the e-learning environment, it is called augmented learning. By adapting to the needs of individuals, the context-driven instruction can be dynamically tailored to the learner's natural environment. Augmented digital content may include text, images, video, audio (music and voice). By personalizing instruction, augmented learning has been shown to improve learning performance for a lifetime.[46] See also minimally invasive education.

Moore (1989)[47] purported that three core types of interaction are necessary for quality, effective online learning:

- Learner–learner (i.e. communication between and among peers with or without the teacher present),
- Learner–instructor (i.e. student-teacher communication), and
- Learner–content (i.e. intellectually interacting with content that results in changes in learners' understanding, perceptions, and cognitive structures).

In his theory of transactional distance, Moore (1993)[48] contented that structure and interaction or dialogue bridge the gap in understanding and communication that is created by geographical distances (known as transactional distance).

Rote learning

[edit]
Main article: Rote learning

Rote learning is memorizing information so that it can be recalled by the learner exactly the way it was read or heard. The major technique used for rote learning is *learning by repetition*, based on the idea that a learner can recall the material exactly (but not its meaning) if the information is repeatedly processed. Rote learning is used in diverse areas, from mathematics to music to religion.

Meaningful learning

[edit]
See also: Deeper learning

Meaningful learning is the concept that learned knowledge (e.g., a fact) is fully understood to the extent that it relates to other knowledge. To this end, meaningful learning contrasts with rote learning in which information is acquired without regard to understanding. Meaningful learning, on the other hand, implies there is a comprehensive knowledge of the context of the facts learned.[49]

Evidence-based learning

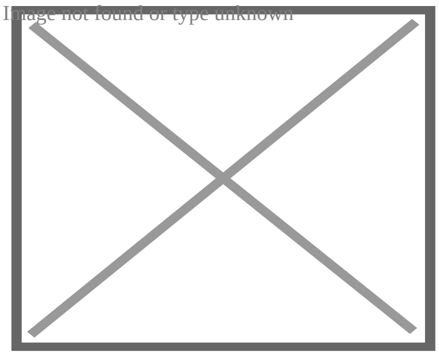
[edit]
Main article: Evidence-based learning

Evidence-based learning is the use of evidence from well designed scientific studies to accelerate learning. Evidence-based learning methods such as spaced repetition can increase the rate at which a student learns.[50]

Formal learning

[edit]

Main article: Education



A depiction of the world's oldest continually operating university, the University of Bologna, Italy

Formal learning is a deliberate way attaining of knowledge, which takes place within a teacher-student environment, such as in a school system or work environment.[51][52] The term formal learning has nothing to do with the formality of the learning, but rather the way it is directed and organized. In formal learning, the learning or training departments set out the goals and objectives of the learning and oftentimes learners will be awarded with a diploma, or a type of formal recognition.[51][53]

Non-formal learning

[edit]
Main article: Nonformal learning

Non-formal learning is organized learning outside the formal learning system. For example, learning by coming together with people with similar interests and exchanging viewpoints, in clubs or in (international) youth organizations, and workshops. From the organizer's point of reference, non-formal learning does not always need a main objective or learning outcome. From the learner's point of view, non-formal learning, although not focused on outcomes, often results in an intentional learning opportunity.[54]

Informal learning

[edit]
Main article: Informal learning

Informal learning is less structured than "non-formal learning". It may occur through the experience of day-to-day situations (for example, one would learn to look ahead while walking because of the possible dangers inherent in not paying attention to where one is going). It is learning from life, during a meal at the table with parents, during play, and while exploring etc.. For the learner, informal learning is most often an experience of happenstance, and not a deliberately planned experience. Thus this does not require enrollment into any class. Unlike formal learning, informal learning typically does not lead to accreditation.[54] Informal learning begins to unfold as the learner ponders his or her situation. This type of learning does not require a professor of any kind, and learning outcomes are unforeseen following the learning experience.[55]

Informal learning is self-directed and because it focuses on day-to-day situations, the value of informal learning can be considered high. As a result, information retrieved from informal learning experiences will likely be applicable to daily life.[56] Children with informal learning can at times yield stronger support than subjects with formal learning in the topic of mathematics.[57] Daily life experiences take place in the workforce, family life, and any other situation that may arise during one's lifetime. Informal learning is voluntary from the learner's viewpoint, and may require making mistakes and learning from them. Informal learning allows the individual to discover coping strategies for difficult emotions that may arise while learning. From the learner's perspective, informal learning can become purposeful, because the learner chooses which rate is appropriate to learn and because this type of learning tends to take place within smaller groups or by oneself.[56]

Nonformal learning and combined approaches

[edit]

The educational system may use a combination of formal, informal, and nonformal learning methods. The UN and EU recognize these different forms of learning (cf. links below). In some schools, students can get points that count in the formal-learning systems if they get work done in informal-learning circuits. They may be given time to assist international youth workshops and training courses, on the condition they prepare, contribute, share, and can prove this offered valuable new insight, helped to acquire new skills, a place to get experience in organizing, teaching, etc.

To learn a skill, such as solving a Rubik's Cube quickly, several factors come into play at once:

- Reading directions helps a player learn the patterns that solve the Rubik's Cube.
- Practicing the moves repeatedly helps build "muscle memory" and speed.
- Thinking critically about moves helps find shortcuts, which speeds future attempts.
- Observing the Rubik's Cube's six colors help anchor solutions in the mind.
- Revisiting the cube occasionally helps retain the skill.

Tangential learning

[edit]

Tangential learning is the process by which people self-educate if a topic is exposed to them in a context that they already enjoy. For example, after playing a music-based video game, some people may be motivated to learn how to play a real instrument, or after watching a TV show that references Faust and Lovecraft, some people may be inspired to read the original work.[58] Self-education can be improved with systematization. According to experts in natural learning, self-oriented learning training has proven an effective tool for assisting independent learners with the natural phases of learning.[59]

Extra Credits writer and game designer James Portnow was the first to suggest games as a potential venue for "tangential learning".[60] Mozelius *et al.*[61] points out that intrinsic integration of learning content seems to be a crucial design factor, and that games that include modules for further self-studies tend to present good results. The built-in encyclopedias in the *Civilization* games are presented as an example – by using these modules gamers can dig deeper for knowledge about historical events in the gameplay. The importance of rules that regulate learning modules and game experience is discussed by Moreno, C.,[62] in a case study about the mobile game Kiwaka. In this game, developed by Landka in collaboration with ESA and ESO, progress is rewarded with educational content, as opposed to traditional education games where learning activities are rewarded with gameplay.[63][64]

Dialogic learning

[edit]
Main article: Dialogic learning

Dialogic learning is a type of learning based on dialogue.

Incidental learning

[edit]

In *incidental teaching* learning is not planned by the instructor or the student, it occurs as a byproduct of another activity — an experience, observation, self-reflection, interaction, unique event (e.g. in response to incidents/accidents), or common routine task. This learning happens in addition to or apart from the instructor's plans and the student's expectations. An example of incidental teaching is when the instructor places a train set on top of a cabinet. If the child points or walks towards the cabinet, the instructor prompts the student to say "train". Once the student says "train", he gets access to the train set.

Here are some steps most commonly used in incidental teaching:[65]

- An instructor will arrange the learning environment so that necessary materials are within the student's sight, but not within his reach, thus impacting his motivation to seek out those materials.
- An instructor waits for the student to initiate engagement.
- An instructor prompts the student to respond if needed.
- An instructor allows access to an item/activity contingent on a correct response from the student.
- The instructor fades out the prompting process over a period of time and subsequent trials.

Incidental learning is an occurrence that is not generally accounted for using the traditional methods of instructional objectives and outcomes assessment. This type of learning occurs in part as a product of social interaction and active involvement in both online and onsite courses. Research implies that some un-assessed aspects of onsite and online learning challenge the equivalency of education between the two modalities. Both onsite and online learning have distinct advantages with traditional on-campus students experiencing higher degrees of incidental learning in three times as many areas as online students. Additional research is called for to investigate the implications of these findings both conceptually and pedagogically.[66]

Domains

[edit]

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Future school (1901 or 1910)

Benjamin Bloom has suggested three domains of learning in his taxonomy which are:

- Cognitive: To recall, calculate, discuss, analyze, problem solve, etc.
- Psychomotor: To dance, swim, ski, dive, drive a car, ride a bike, etc.
- Affective: To like something or someone, love, appreciate, fear, hate, worship, etc.

These domains are not mutually exclusive. For example, in learning to play chess, the person must learn the rules (cognitive domain)—but must also learn how to set up the chess pieces and how to properly hold and move a chess piece (psychomotor). Furthermore, later in the game the person may even learn to love the game itself, value its applications in life, and appreciate its history (affective domain).[67]

Transfer

[edit]

Transfer of learning is the application of skill, knowledge or understanding to resolve a novel problem or situation that happens when certain conditions are fulfilled. Research indicates that learning transfer is infrequent; most common when "... cued, primed, and guided..."[68] and has sought to clarify what it is, and how it might be promoted through instruction.

Over the history of its discourse, various hypotheses and definitions have been advanced. First, it is speculated that different types of transfer exist, including: near transfer, the application of skill to solve a novel problem in a similar context; and far transfer, the application of skill to solve a novel problem presented in a different context.[69] Furthermore, Perkins and Salomon (1992) suggest that positive transfer in cases when learning supports novel problem solving, and negative transfer occurs when prior learning inhibits performance on highly correlated tasks, such as second or third-language learning.[70] Concepts of positive and negative transfer have a long history; researchers in the early 20th century described the possibility that "...habits or mental acts developed by a particular kind of training may inhibit rather than facilitate other mental activities".[71] Finally, Schwarz, Bransford and Sears (2005) have proposed that transferring knowledge into a situation may differ from transferring knowledge out to a situation as a means to reconcile findings that transfer may both be frequent and challenging to promote.[72]

A significant and long research history has also attempted to explicate the conditions under which transfer of learning might occur. Early research by Ruger, for example, found that the "level of attention", "attitudes", "method of attack" (or method for tackling a problem), a "search for new points of view", a "careful testing of hypothesis" and "generalization" were all valuable approaches for promoting transfer.[73] To encourage transfer through teaching, Perkins and Salomon recommend aligning ("hugging") instruction with practice and assessment, and "bridging", or encouraging learners to reflect on past experiences or make connections between prior knowledge and current content.[70]

Factors affecting learning

[edit]
Main article: Evidence-based learning

Genetics

[edit]
Main article: Heritability of IQ

Some aspects of intelligence are inherited genetically, so different learners to some degree have different abilities with regard to learning and speed of learning.[*citation needed*]

Socioeconomic and physical conditions

[edit]

Problems like malnutrition, fatigue, and poor physical health can slow learning, as can bad ventilation or poor lighting at home, and unhygienic living conditions.[74][75]

The design, quality, and setting of a learning space, such as a school or classroom, can each be critical to the success of a learning environment. Size, configuration, comfort—fresh air, temperature, light, acoustics, furniture—can all affect a student's learning. The tools used by both instructors and students directly affect how information is conveyed, from the display and writing surfaces (blackboards, markerboards, tack surfaces) to digital technologies. For example, if a room is too crowded, stress levels rise, student attention is reduced, and furniture arrangement is restricted. If furniture is incorrectly arranged, sightlines to the instructor or instructional material are limited and the ability to suit the learning or lesson style is restricted. Aesthetics can also play a role, for if student morale suffers, so does motivation to attend school.[76][77]

Psychological factors and teaching style

[edit]

Intrinsic motivation, such as a student's own intellectual curiosity or desire to experiment or explore, has been found to sustain learning more effectively than extrinsic motivations such as grades or parental requirements. Rote learning involves repetition in order to reinforce facts in memory, but has been criticized as ineffective and "drill and kill" since it kills intrinsic motivation. Alternatives to rote learning include active learning and meaningful learning.

The speed, accuracy, and retention, depend upon aptitude, attitude, interest, attention, energy level, and motivation of the students. Students who answer a question properly or give good results should be praised. This encouragement increases their ability and helps them produce better results. Certain attitudes, such as always finding fault in a student's answer or provoking or embarrassing the student in front of a class are counterproductive.[78][79][*need quotation to verify*]

Certain techniques can increase long-term retention:[80]

- The spacing effect means that lessons or studying spaced out over time (spaced repetition) are better than cramming
- Teaching material to other people
- "Self-explaining" (paraphrasing material to oneself) rather than passive reading
- Low-stakes quizzing

Epigenetic factors

[edit]
Further information: Epigenetics in learning and memory

The underlying molecular basis of learning appears to be dynamic changes in gene expression occurring in brain neurons that are introduced by epigenetic mechanisms. Epigenetic regulation of gene expression involves, most notably, chemical modification of DNA or DNA-associated histone proteins. These chemical modifications can cause long-lasting changes in gene expression. Epigenetic mechanisms involved in learning include the methylation and demethylation of neuronal DNA as well as methylation, acetylation and deacetylation of neuronal histone proteins.

During learning, information processing in the brain involves induction of oxidative modification in neuronal DNA followed by the employment of DNA repair processes that introduce epigenetic alterations. In particular, the DNA repair processes of non-homologous end joining and base excision repair are employed in learning and memory formation.[81][82]

General cognition-related factors

[edit]
This section is an excerpt from Development of the nervous system in humans § Adult neural development.[edit]

The nervous system continues to develop during adulthood until brain death. For example:

- physical exercise has neurobiological effects
- the consumption of foods (or nutrients), obesity,[83] alterations of the microbiome, drinks, dietary supplements, recreational drugs and medications[84][85] may possibly also have effects on the development of the nervous system
- various diseases, such as COVID-19, have effects on the development of the nervous system
    - For example, several genes have been identified as being associated with changes in brain structure over lifetime and are potential Alzheimer's disease therapy-targets.[86][87]
- psychological events such as mental trauma and resilience-building
- exposure to environmental pollution and toxins such as air pollution may have effects on the further development of the nervous system
- other activities may also have effects on the development of the nervous system, such as lifelong learning, retraining, and types of media- and economic activities
- broadly, brain aging

Adult learning vs children's learning

[edit]
See also: Aging brain
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Learning is often more efficient in children and takes longer or is more difficult with age. A study using neuroimaging identified rapid neurotransmitter GABA boosting as a major potential explanation-component for why that is.[88][89]

Children's brains contain more "silent synapses" that are inactive until recruited as part of neuroplasticity and flexible learning or memories.[90][91] Neuroplasticity is heightened during critical or sensitive periods of brain development, mainly referring to brain development during child development.[92]

However researchers, after subjecting late middle aged participants to university courses, suggest perceived age differences in learning may be a result of differences in time, support, environment, and attitudes, rather than inherent ability.[93]

What humans learn at the early stages, and what they learn to apply, sets humans on course for life or has a disproportional impact.[94] Adults usually have a higher capacity to select what they learn, to what extent and how. For example, children may learn the given subjects and topics of school curricula via classroom blackboard-transcription handwriting, instead of being able to choose specific topics/skills or jobs to learn and the styles of learning. For instance, children may not have developed consolidated interests, ethics, interest in purpose and meaningful activities, knowledge about real-world requirements and demands, and priorities.

In animal evolution

[edit]

Animals gain knowledge in two ways. First is learning—in which an animal gathers information about its environment and uses this information. For example, if an animal eats something that hurts its stomach, it learns not to eat that again. The second is innate knowledge that is genetically inherited. An example of this is when a horse is born and can immediately walk. The horse has not learned this behavior; it simply knows how to do it.[95] In some scenarios, innate knowledge is more beneficial than learned knowledge. However, in other scenarios the opposite is true—animals must learn certain behaviors when it is disadvantageous to have a specific innate behavior.

In these situations, learning evolves in the species.

Costs and benefits of learned and innate knowledge

[edit]

In a changing environment, an animal must constantly gain new information to survive. However, in a stable environment, this same individual needs to gather the information it needs once, and then rely on it for the rest of its life. Therefore, different scenarios better suit either learning or innate knowledge. Essentially, the cost of obtaining certain knowledge versus the benefit of already having it determines whether an animal evolved to learn in a given situation, or whether it innately knew the information. If the cost of gaining the knowledge outweighs the benefit of having it, then the animal does not evolve to learn in this scenario—but instead, non-learning evolves. However, if the benefit of having certain information outweighs the cost of obtaining it, then the animal is far more likely to evolve to have to learn this information.[95]

Non-learning is more likely to evolve in two scenarios. If an environment is static and change does not or rarely occurs, then learning is simply unnecessary. Because there is no need for learning in this scenario—and because learning could prove disadvantageous due to the time it took to learn the information—non-learning evolves. Similarly, if an environment is in a constant state of change, learning is also disadvantageous, as anything learned is immediately irrelevant because of the changing environment.[95] The learned information no longer applies. Essentially, the animal would be just as successful if it took a guess as if it learned. In this situation, non-learning evolves. In fact, a study of *Drosophila melanogaster* showed that learning can actually lead to a decrease in productivity, possibly because egg-laying behaviors and decisions were impaired by interference from the memories gained from the newly learned materials or because of the cost of energy in learning.[96]

However, in environments where change occurs within an animal's lifetime but is not constant, learning is more likely to evolve. Learning is beneficial in these scenarios because an animal can adapt to the new situation, but can still apply the knowledge that it learns for a somewhat extended period of time. Therefore, learning increases the chances of success as opposed to guessing.[95] An example of this is seen in aquatic environments with landscapes subject to change. In these environments, learning is favored because the fish are predisposed to learn the specific spatial cues where they live.[97]

In plants

[edit]

In recent years, plant physiologists have examined the physiology of plant behavior and cognition. The concepts of learning and memory are relevant in identifying how plants respond to external cues, a behavior necessary for survival. Monica Gagliano, an Australian professor of evolutionary ecology, makes an argument for associative learning in the garden pea, *Pisum sativum*. The garden pea is not specific to a region, but rather grows in cooler, higher altitude climates. Gagliano and colleagues' 2016 paper aims to differentiate between innate phototropism behavior and learned behaviors.[32] Plants use light cues in various ways, such as to sustain their metabolic needs and to maintain their internal circadian rhythms. Circadian rhythms in plants are modulated by endogenous bioactive substances that encourage leaf-opening and leaf-closing and are the basis of nyctinastic behaviors.[98]

Gagliano and colleagues constructed a classical conditioning test in which pea seedlings were divided into two experimental categories and placed in Y-shaped tubes.[32] In a series of training sessions, the plants were exposed to light coming down different arms of the tube. In each case, there was a fan blowing lightly down the tube in either the same or opposite arm as the light. The unconditioned stimulus (US) was the predicted occurrence of light and the conditioned stimulus (CS) was the wind blowing by the fan. Previous experimentation shows that plants respond to light by bending and growing towards it through differential cell growth and division on one side of the plant stem mediated by auxin signaling pathways.[99]

During the testing phase of Gagliano's experiment, the pea seedlings were placed in different Y-pipes and exposed to the fan alone. Their direction of growth was subsequently recorded. The 'correct' response by the seedlings was deemed to be growing into the arm where the light was "predicted" from the previous day. The majority of plants in both experimental conditions grew in a direction consistent with the predicted location of light based on the position of the fan the previous day.[32] For example, if the seedling was trained with the fan and light coming down the same arm of the Y-pipe, the following day the seedling grew towards the fan in the absence of light cues despite the fan being placed in the opposite side of the Y-arm. Plants in the control group showed no preference to a particular arm of the Y-pipe. The percentage difference in population behavior observed between the control and experimental groups is meant to distinguish innate phototropism behavior from active associative learning.[32]

While the physiological mechanism of associative learning in plants is not known, Telewski et al. describes a hypothesis that describes photoreception as the basis of mechano-perception in plants.[100] One mechanism for mechano-perception in plants relies on MS ion channels and calcium channels. Mechanosensory proteins in cell lipid bilayers, known as MS ion channels, are activated once they are physically deformed in response to pressure or tension. Ca2+ permeable ion channels are "stretch-gated" and allow for the influx of osmolytes and calcium, a well-known second messenger, into the cell. This ion influx triggers a passive flow of water into the cell down its osmotic gradient, effectively increasing turgor pressure and causing the cell to depolarize.[100] Gagliano hypothesizes that the basis of associative learning in *Pisum sativum* is the coupling of mechanosensory and photosensory pathways and is mediated by auxin signaling pathways. The result is directional growth to maximize a plant's capture of sunlight.[32]

Gagliano et al. published another paper on habituation behaviors in the *mimosa pudica* plant whereby the innate behavior of the plant was diminished by repeated exposure to a stimulus.[18] There has been controversy around this paper and more generally around the topic of plant cognition. Charles Abrahmson, a psychologist and behavioral biologist, says that part of the issue of why scientists disagree about whether plants have the ability to learn is that researchers do not use a consistent definition of "learning" and "cognition".[101] Similarly, Michael Pollan, an author, and journalist, says in his piece *The Intelligent Plant* that researchers do not doubt Gagliano's data but rather her language, specifically her use of the term "learning" and "cognition" with respect to plants.[102] A direction for future research is testing whether circadian rhythms in plants modulate learning and behavior and surveying researchers' definitions of "cognition" and "learning".

Machine learning

[edit]

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Robots can learn to cooperate.

Main article: Machine learning

Machine learning, a branch of artificial intelligence, concerns the construction and study of systems that can learn from data. For example, a machine learning system could be trained on email messages to learn to distinguish between spam and non-spam messages. Most of the Machine Learning models are based on probabilistic theories where each input (e.g. an image) is associated with a probability to become the desired output.

Types

[edit]

Phases

[edit]

See also

[edit]

- 21st century skills – Skills identified as being required for success in the 21st century
- Anticipatory socialization – Process in which people take on the values of groups that they aspire to join
- Epistemology – Philosophical study of knowledge
- Implicit learning – in learning psychology
- Instructional theory – Theory that offers explicit guidance on how to better help people learn and develop
- Learning sciences – Critical theory of learning
- Lifelong learning – Ongoing, voluntary, and self-motivated pursuit of knowledge
- Living educational theory
- Media psychology – Area of psychology
- Subgoal labeling – Cognitive process

Information theory

[edit]

- Algorithmic information theory – Subfield of information theory and computer science
- Algorithmic probability – mathematical method of assigning a prior probability to a given observation
- Bayesian inference – Method of statistical inference
- Inductive logic programming – learning logic programs from data
- Inductive probability – Determining the probability of future events based on past events
- Information theory – Scientific study of digital information
- Minimum description length – Model selection principle

- Minimum message length – Formal information theory restatement of Occam's Razor
- Occam's razor – Philosophical problem-solving principle
- Solomonoff's theory of inductive inference – A mathematical theory
- AIXI – Mathematical formalism for artificial general intelligence

Types of education

[edit]
- Autodidacticism – Independent education without the guidance of teachers
- Andragogy – Methods and principles in adult education
- Pedagogy – Theory and practice of education

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[edit]

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Further reading

[edit]

Library resources about
Learning

- Resources in your library
- *Ulrich Boser (2019). Learn Better: Mastering the Skills for Success in Life, Business, and School, or How to Become an Expert in Just About Anything. Rodale Books. ISBN 978-0593135310.*

External links

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Wikimedia Commons has media related to ***Learning***.

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Wikiquote has quotations related to ***Learning***.

- *How People Learn: Brain, Mind, Experience, and School* (expanded edition) published by the National Academies Press
- *Applying Science of Learning in Education: Infusing Psychological Science into the Curriculum* published by the American Psychological Association

Links to related articles

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Ethology

Branches

- Animal cognition
- Animal communication
- Animal consciousness
- Animal culture
- Animal sexual behaviour
- Animal welfare science
- Anthrozoology
- Bee learning and communication
- Behavioural ecology
- Behavioral endocrinology
- Behavioural genetics
- Breed
- Cognitive ethology
- Comfort behaviour
    - Grooming
- Comparative psychology
- Emotion in animals
- Ethogram
- Evolutionary neuroscience
- Feeding
- Hover
- Human ethology
- Instinct
- Learning
- Neuroethology
- Pain in animals
- Philosophical ethology
- Sociobiology
- Stereotypy
- Structures
    - Hive
    - Honeycomb
    - Nest
    - Instinct
- Swarm
- Tool use by non-humans
- Zoosemiotics
- Zoomusicology

Ethologists

- Patrick Bateson
- Marc Bekoff
- Donald Broom
- John B. Calhoun
- Charles Darwin
- Marian Dawkins
- Richard Dawkins
- Irenäus Eibl-Eibesfeldt
- Dian Fossey
- Karl von Frisch
- Jane Goodall
- Heini Hediger
- Julian Huxley
- Konrad Lorenz
- Desmond Morris
- Thomas Sebeok
- William Homan Thorpe
- Nikolaas Tinbergen
- Jakob von Uexküll
- Wolfgang Wickler
- E. O. Wilson
- Solly Zuckerman

Societies

- Association for the Study of Animal Behaviour
- International Society for Applied Ethology

Journals

- *Animal Behaviour*
- *Animal Cognition*
- *Animal Welfare*
- *Behavioral Ecology*
- *Behaviour*

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Human intelligence topics

Types	○ Collective ○ Emotional ○ Intellectual ○ Linguistic ○ Multiple ○ Social ○ Spatial (visuospatial)
Abilities, traits, and constructs	○ Cognition ○ Cognitive liberty ○ Communication ○ Creativity ○ Fluid and crystallized intelligence ○ *g* factor ○ Intellect ○ Intelligence quotient ○ Knowledge ○ Learning ○ Memory ○ Problem solving ○ Reasoning ○ Skill ○ Thought (abstraction) ○ Understanding ○ Visual processing
Models and theories	○ Cattell–Horn–Carroll theory ○ Fluid and crystallized intelligence ○ Multiple-intelligences theory ○ PASS theory ○ Three-stratum theory ○ Triarchic theory
Areas of research	○ Evolution of human intelligence ○ Heritability of IQ ○ Psychometrics ○ Intelligence and environment / fertility / height / health / longevity / neuroscience / personality / race / sex

- Image not found or type unknown Outline of human intelligence / thought

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Learning

Non-associative learning	- Habituation - Sensitization
Associative learning	- Classical conditioning - Imprinting - Observational learning - Operant conditioning
Insight learning	- Abductive reasoning - Deductive reasoning - Inductive reasoning

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Mental processes

Cognition	- Association
	- Awareness
	- Cognitive flexibility
	- Cognitive liberty
	- Forecasting
	  - affective
	- Foresight
	- Comprehension
	- Consciousness
	- Critical thinking
	- Decision-making
	- Imagination
	- Intuition
	- Problem solving
	  - methods
	  - strategies
	- Prospection

Perception

- Amodal
- Color
  - RGB model
- Depth
- Form
- Haptic (Touch)
- Perception as interpretation
- Peripheral
- Social
- Sound
  - Harmonics
  - Pitch
  - Speech
- Visual

Memory

- Consolidation
- Encoding
- Storage
- Recall

Other

- Attention
- Experiential avoidance
- Higher nervous activity
- Intention
- Ironic process theory
- Learning
- Mental fatigue
- Relational frame theory
- Mental set
- Thinking
- Thought suppression
- Volition

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- Czech Republic
- Spain

About patient

For the state of being, see Patience. For other uses, see Patient (disambiguation).

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Part of a series on Patients

Patients

Concepts

- Doctor-patient relationship
- Medical ethics
- Patient participation
- Patient-reported outcome
- Patient safety

Consent

- Informed consent
- Adherence
- Informal coercion
- Motivational interviewing
- Involuntary treatment

Rights

- Patients' rights
- Pregnant patients' rights
- Disability rights movement
- Patient's Charter
- Medical law

Approaches

- Patient advocacy
- Patient-centered care
- Patient and public involvement

Abuse

- Patient abuse
- Elder abuse

Medical sociology

- Sick role

A **patient** is any recipient of health care services that are performed by healthcare professionals. The patient is most often ill or injured and in need of treatment by a physician, nurse, optometrist, dentist, veterinarian, or other health care provider.

Etymology

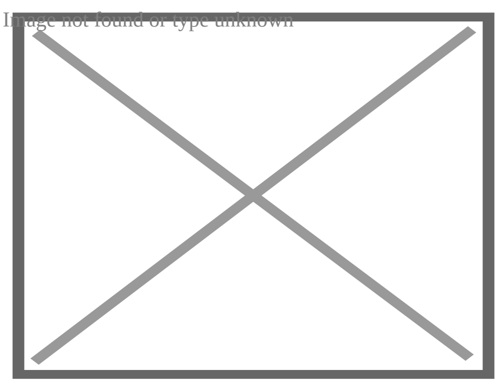
[edit]

The word patient originally meant 'one who suffers'. This English noun comes from the Latin word *patiens*, the present participle of the deponent verb, *patior*, meaning 'I am suffering', and akin to the Greek verb ?ÃŽÂ¬????? (*paskhein* 'to suffer') and its cognate noun ?ÃŽÂ¬??? (*pathos*).

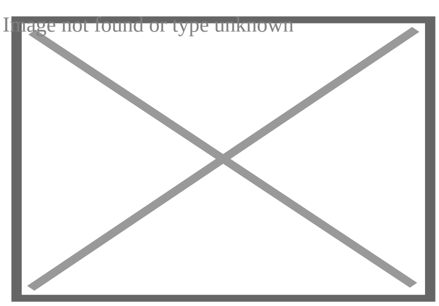
This language has been construed as meaning that the role of patients is to passively accept and tolerate the suffering and treatments prescribed by the healthcare providers, without engaging in shared decision-making about their care.[1]

Outpatients and inpatients

[edit]

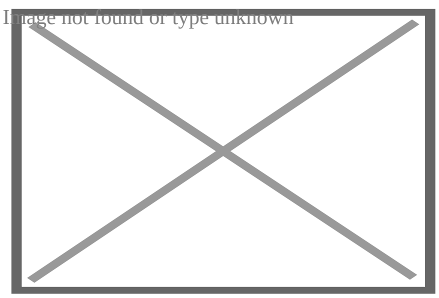


Patients at the Red Cross Hospital in Tampere, Finland during the 1918 Finnish Civil War



Receptionist in Kenya attending to an outpatient

An **outpatient** (or **out-patient**) is a patient who attends an outpatient clinic with no plan to stay beyond the duration of the visit. Even if the patient will not be formally admitted with a note as an outpatient, their attendance is still registered, and the provider will usually give a note explaining the reason for the visit, tests, or procedure/surgery, which should include the names and titles of the participating personnel, the patient's name and date of birth, signature of informed consent, estimated pre-and post-service time for history and exam (before and after), any anesthesia, medications or future treatment plans needed, and estimated time of discharge absent any (further) complications. Treatment provided in this fashion is called ambulatory care. Sometimes surgery is performed without the need for a formal hospital admission or an overnight stay, and this is called outpatient surgery or day surgery, which has many benefits including lowered healthcare cost, reducing the amount of medication prescribed, and using the physician's or surgeon's time more efficiently. Outpatient surgery is suited best for more healthy patients undergoing minor or intermediate procedures (limited urinary-tract, eye, or ear, nose, and throat procedures and procedures involving superficial skin and the extremities). More procedures are being performed in a surgeon's office, termed *office-based surgery*, rather than in a hospital-based operating room.



A mother spends days sitting with her son, a hospital patient in Mali

An **inpatient** (or **in-patient**), on the other hand, is "admitted" to stay in a hospital overnight or for an indeterminate time, usually, several days or weeks, though in some extreme cases, such as with coma or persistent vegetative state, patients can stay in hospitals for years, sometimes until death. Treatment provided in this fashion is called inpatient care. The admission to the hospital involves the production of an admission note. The leaving of the hospital is officially termed *discharge*, and involves a corresponding discharge note, and sometimes an assessment process to consider ongoing needs. In the English National Health Service this may take the form of "Discharge to Assess" - where the assessment takes place after the patient has gone home.[2]

Misdiagnosis is the leading cause of medical error in outpatient facilities. When the U.S. Institute of Medicine's groundbreaking 1999 report, *To Err Is Human*, found up to 98,000 hospital patients die from preventable medical errors in the U.S. each year,[3] early efforts focused on inpatient safety.[4] While patient safety efforts have focused on inpatient hospital settings for more than a decade, medical errors are even more likely to happen in a doctor's office or outpatient clinic or center.[*citation needed*]

Day patient

[edit]

A **day patient** (or **day-patient**) is a patient who is using the full range of services of a hospital or clinic but is not expected to stay the night. The term was originally used by psychiatric hospital services using of this patient type to care for people needing support to make the transition from in-patient to out-patient care. However, the term is now also heavily used for people attending hospitals for day surgery.

Alternative terminology

[edit]

Because of concerns such as dignity, human rights and political correctness, the term "patient" is not always used to refer to a person receiving health care. Other terms that are sometimes used include **health consumer**, **healthcare consumer**, **customer** or **client**. However, such terminology may be offensive to those receiving public health care, as it implies a business relationship.

In veterinary medicine, the **client** is the owner or guardian of the patient. These may be used by governmental agencies, insurance companies, patient groups, or health care facilities. Individuals who use or have used psychiatric services may alternatively refer to themselves as consumers, users, or survivors.

In nursing homes and assisted living facilities, the term **resident** is generally used in lieu of *patient*.[5] Similarly, those receiving home health care are called *clients*.

Patient-centered healthcare

[edit]
See also: Patient participation

The doctor–patient relationship has sometimes been characterized as silencing the voice of patients.[6] It is now widely agreed that putting patients at the centre of healthcare[7] by trying to provide a consistent, informative and respectful service to patients will improve both outcomes and patient satisfaction.[8]

When patients are not at the centre of healthcare, when institutional procedures and targets eclipse local concerns, then patient neglect is possible.[9] Incidents, such as the Stafford Hospital scandal, Winterbourne View hospital abuse scandal and the Veterans Health Administration controversy of 2014 have shown the dangers of prioritizing cost control over the patient experience.[10] Investigations into these and other scandals have recommended that healthcare systems put patient experience at the center, and especially that patients themselves are heard loud and clear within health services.[11]

There are many reasons for why health services should listen more to patients. Patients spend more time in healthcare services than regulators or quality controllers, and can recognize problems such as service delays, poor hygiene, and poor conduct.[12] Patients are particularly good at identifying soft problems, such as attitudes, communication, and 'caring neglect',[9] that are difficult to capture with institutional monitoring.[13]

One important way in which patients can be placed at the centre of healthcare is for health services to be more open about patient complaints.[14] Each year many hundreds of thousands of patients complain about the care they have received, and these complaints contain valuable information for any health services which want to learn about and improve patient experience.[15]

See also

[edit]

- Casualty
- e-Patient
- Mature minor doctrine
- Nurse-client relationship
- Patient abuse
- Patient advocacy
- Patient empowerment
- Patients' Bill of Rights
- Radiological protection of patients
- Therapeutic inertia
- Virtual patient
- Patient UK

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External links

[edit]

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Look up ***patient*** in Wiktionary, the free dictionary.

- *Jadad AR, Rizo CA, Enkin MW (June 2003). "I am a good patient, believe it or not". BMJ.* ***326*** *(7402): 1293–5. doi:10.1136/bmj.326.7402.1293. PMC 1126181. PMID 12805157.*
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  review article with views on the meaning of the words "good doctor" vs. "good patient"
- "Time Magazine's Dr. Scott Haig Proves that Patients Need to Be Googlers!" – Mary Shomons response to the Time Magazine article "When the Patient is a Googler"

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Articles about hospitals

History of hospitals, Hospital network, Category:Hospitals

Common hospital components	○ Accreditation ○ Bed ○ Coronary care unit ○ Emergency department ○ Emergency codes ○ Hospital administrators ○ Hospital information system ○ Hospital medicine ○ Hospital museum ○ Hospitalist ○ Intensive care unit ○ Nocturnist ○ On-call room ○ Operating theater ○ Orderly ○ Patients ○ Pharmacy ○ Wards
Archaic forms	○ Almshouse ○ Asclepeion (Greece) ○ Bimaristan (Islamic) ○ Cottage hospital (England) ○ Hôtel-Dieu (France) ○ Valetudinaria (Roman) ○ Vaishya lying in houses (India) ○ Xenodochium (Middle Ages)
Geographic service area	○ Base hospital (Australia) ○ Community hospital ○ General hospital ○ Regional hospital or District hospital ○ Municipal hospital
Complexity of services	○ Day hospital ○ Secondary hospital ○ Tertiary referral hospital ○ Teaching hospital ○ Specialty hospital
Unique physical traits	○ Hospital ship ○ Hospital train ○ Mobile hospital ○ Underground hospital ○ Virtual Hospital

Limited class of patients	○ Military hospital ○ Combat support hospital ○ Field hospital ○ Prison hospital ○ Veterans medical facilities ○ Women's hospital
Funding	○ Charitable hospital ○ For-profit hospital ○ Non-profit hospital ○ State hospital ○ Private hospital ○ Public hospital ○ Voluntary hospital
Condition treated	○ Defunct ○ Cancer ○ Children's hospital ○ Eye hospital ○ Fever hospital ○ Leper colony ○ Lock hospital ○ Maternity hospital ○ Psychiatric hospital ○ Rehabilitation hospital ○ Trauma center ○ Verterinary hospital
Century established	○ 5th ○ 6th ○ 7th ○ 8th ○ 9th ○ 10th ○ 11th ○ 12th ○ 13th ○ 14th ○ 15th ○ 16th ○ 17th ○ 18th ○ 19th ○ 20th ○ 21st

Lists of hospitals in: Africa, Asia, Europe, North America, Oceania, South America

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Frequently Asked Questions

What are the common challenges in the charge capture process that impact revenue integrity?

Common challenges include incomplete or inaccurate documentation, lack of standardized procedures, poor communication between clinical and billing staff, and inadequate training. These issues can lead to missed charges or incorrect billing, ultimately impacting revenue.

How can technology be leveraged to enhance charge capture accuracy and efficiency?

Implementing electronic health record (EHR) systems with integrated coding tools can streamline documentation and ensure accurate coding. Automated charge capture solutions reduce manual entry errors by flagging discrepancies and ensuring all services are accounted for before submission.

What role does staff training play in optimizing the charge capture process?

Staff training is crucial for ensuring that all personnel involved understand the importance of accurate documentation and coding. Regular training sessions help keep staff updated on coding changes, improve compliance with regulations, and foster better collaboration between clinical teams and coders for more efficient workflows.

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