Foundations of Science

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Learning Objectives

Those who have completed this section are expected to gain the following outcomes:

1. Differentiate clearly between the Creator and creatures.
2. Recognize the position of the human being among other creatures on earth.
3. Appreciate the major responsibilities a human being.
4. Express two major categories of sciences and the role of wisdom in each one.
5. Classify the definitive sciences and briefly explain each branch.
6. Describe the role of definitive sciences on the life of a human being.
7. List fundamental branches of probabilistic sciences and briefly describe each branch.
8. Appreciate the importance of the language in attaining knowledge.
9. Describe sense and emotion.
10. Appreciate the necessity of satisfying the human senses and emotions, and responsibilities in their fulfilment.
11. Identify main elements of decision-making and be able to relate them to interaction with the rules.
12. Be able to explain the purpose and importance of education.
13. Distinguish between gained knowledge and innate knowledge
14. Able to define what true, good and beautiful are.
15. Appreciate the necessity and the role of trainers in education.
16. Describe Bloom's taxonomy and levels of learning.
17. Able to define terms such as mission, vision, and student outcomes.
18. Describe the affective domain, and the degree of internalization.
19. Identify levels of learning and relationships between them in the cognitive domain.

20. Recognize the psychomotor domain and its relation with other fields.
21. Show the relation between wisdom and intelligence, and be able to explain their effects in ways of learning.
22. Provide examples of the social impact of the inverse relationship between intelligence and inherited wealth.

2.1 Creator and Creation

Before we proceed into the foundations of scientific knowledge, we must recognize who we are. Muslims believe that the universe with all what it contains are created by Allah Almighty. We do not see the Creator with our bare eyes but we know Him through His attributes. Everything but Him is His creations. The Creator Grants some of His attributes to His creations. However, the Creator's attributes are not subject to dimensions including time.[1] Yet, the creations attributes are limited by dimensions and vary in time.[2]

2.1.1 Who Is the Human Being?

The position of the human being among the creatures is shown in Fig. 2.1. The creatures are broadly classified as the visible (dense) and invisible ones. The soul, angels and jinn (including satan) are the invisible ones. The dense ones can be divided into two major groups as the lifeless and alive ones. The alive ones experience changes in time while the lifeless ones are static and do not change in time. In reality, everything is alive if we study it in a very long time period. However, we can consider it lifeless if there is no noticeable change in it in a regular lifespan of a human being. The alive ones are further divided into two new categories as the plants (ranging from viruses that can be hardly seen under very high power microscopes to equatorial trees that go high in the sky) and animals (ranging from bacteria to whales that overflows the oceans). In the biological sense, the human being is considered among the animals. Various scientists, in different scientific fields, have been trying to term the human beings as they wanted to differentiate it from other creatures using some identifiable distinctive features. Islamic scientists define the human being as the "**responsible creature**" and all others as "**supporting creatures**". We will try to understand the responsibility and its consequences in the following sections.

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[1]This is called "Qidam" meaning forever.

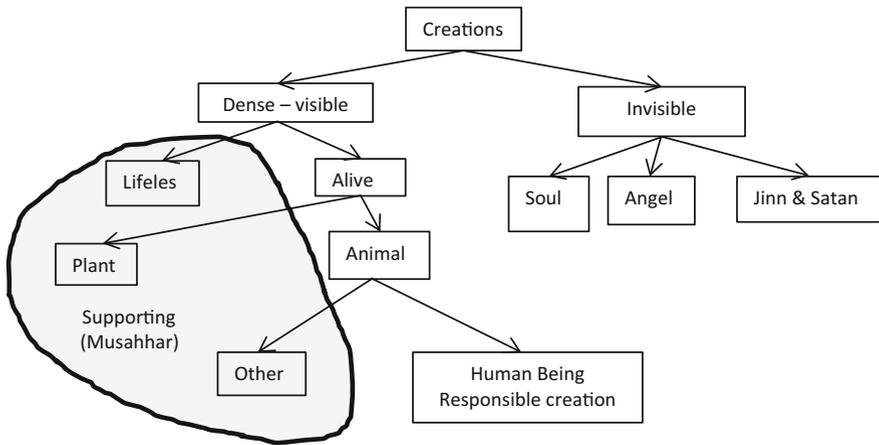[2]This is called "khades" meaning change is expected in time.

Fig. 2.1 The position of human being among creatures

2.1.2 Life and the Responsibility

Life is the name of an activity that begins in the womb, and takes place in three phases as the womb, the earth and the Hereafter. All biological structures that are required in the next phase are formed in the womb. If the little finger is missing for instance, it is not possible to reconstitute it in the earth. If the original is available but not well structured, it might be possible to straighten it through medical practices. Similarly, life in this world is for preparations of the requirements of the Hereafter. This point has been stated as: "**the world is the field of the Hereafter**". Life in the Hereafter is eternal, but the quality of the life depends upon the preparations for it while we are living on the earth.

Muslims believe in Allah (the Creator), His angels, His holy books, His Messengers, and the day of resurrection. The Creator provides guidance for the human being in his/her acts on earth through messengers and prophets who are given holy books. Islam is the only way of life on earth that will be accepted by the Creator and it was brought by the last of the prophets, Mohammed (peace and blessings be upon him). He taught his companions and showed them how to practice it.

According to Islamic sources, the human being is the only creature (among the animals) responsible for his deeds in this world. The purpose of the human being on earth is to act as the vicegerent (khalifah) of the Creator. Allah is the Creator and the responsibility of the human being is the slavery to Allah (kulluk): the submission to the orders and prohibitions of Allah and His messenger in the way He and His messenger order him/her without any objection, argument and return.

No doubt, human mind is capable, within certain limits, of distinguishing right from wrong, and every individual has been endowed with it in some degree. Similarly the knowledge of good and evil is, to some extent, intuitive because human conscience intrinsically feels uneasy in the presence of evil. Islam can

provide us with the commonly agreed and objectively accepted standard, which has been eluding us.

The fact that Allah Almighty taught man shows that he has the Divine gift of learning and thinking. Man employs these qualities to enable him/her to carry out his/her duties and responsibilities in a manner that between good and evil, through his/her will. S/he is the Almighty's vicegerent or deputy on earth. His/her actions on earth will not go unaccounted. Rather, two responsible angels continuously register all good and bad deeds and the record book will be given to the person at the day of resurrection. Content of the book will be judged and even parts of the human body will provide witness to the actions. Eventually, either s/he will be granted a way to paradise or s/he will be thrown into the hellfire.

Worshipping is compulsory in Islam, and it has been included in the basic pillars of faith. But the Islamic forms of worship are not the same sort of mystic exercises that link men with some unknown, mysterious being, and which subject men to perform useless acts and meaningless movements. All the Islamic compulsory forms of worships are designed as exercises and training to enable people to acquire correct morals and habits and to live righteously, and to adhere to these virtues till the end, whatever are the changes in their circumstances. The Muslim, within the limited sphere of his existence, is the absolute master of his/her conduct. Hence, there is individual responsibility. Worshipping improves the Muslim spiritually so that his actions, motives and conscience could reach a stage of development in which feeling of remorse overtakes him in the doing of unrighteous deeds and he becomes keen to perform good deeds.

2.2 Fundamental Sciences

Scholarly sciences are divided into two distinct categories as the definitive (explicit) and probabilistic (implicit) sciences according to Islamic point of view. In definitive sciences, the truth is given by Allah, the Almighty in the form of Qur'anic verses and traditions of His Prophet Muhammad [Sallallahu Alaihi Wa Sallam (SAAW = Peace and Blessings be Upon Him PBUH)]. The mankind uses the wisdom bestowed to understand them and implement them in the life. Both have several branches and each branch has its own method of study. For example, Sociology and Tafsir (exegesis—interpretation of Qur'an) are two distinct sciences, each having its own method for the study. Studying tafsir with the methods of sociology would destroy both sociology and tafsir. Nowadays, if someone is a bit literate in one branch of science s/he feels that s/he can apply the method of that science in all branches and s/he is a great scholar of the time! The tree in Fig. 2.2 lists the major sciences in both categories. Every movement of a human being can only be assessed properly if we look into it from 14 aspects covered by 14 fundamental sciences. Hence, a literate person must have at least a culture level of knowledge in each of these 14 branches of the knowledge in order to make a sound decision about an incident.
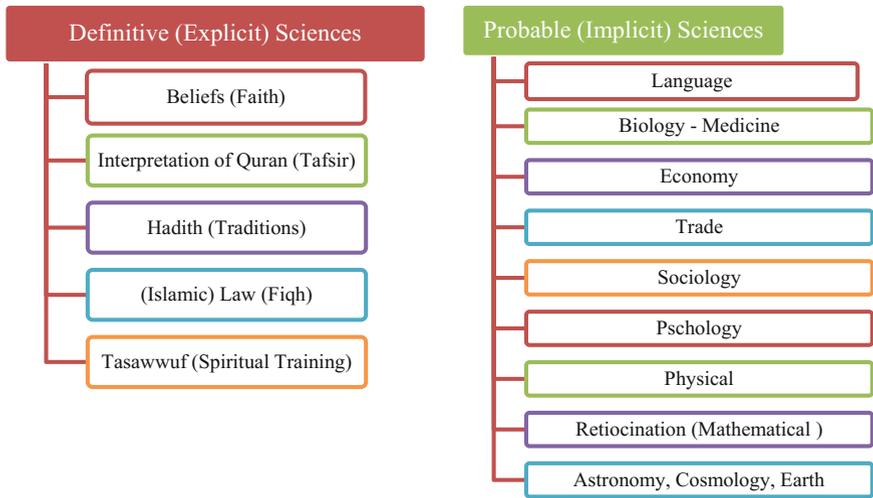
Fig. 2.2 Major branches of definitive and probabilistic sciences

2.2.1   Definitive (Explicit) Sciences

They have five branches as:

- Beliefs (faith)
- Tafsir (Exegesis—Interpretation of Qur'an)
- Hadith (Traditions)
- Fiqh (Islamic law)
- Tasawwuf (Spiritual Training).

Faith is confidence or trust in a person (as in their ability), thing, deity, in the doctrines or teachings of a religion, or view (e.g., having strong political faith) even without empirical evidence. It can also be belief that is not based on proof, or as confidence based upon varying degrees of evidential warrant. In Islam, faith (iman) is complete submission to the determination of Allah; including belief, profession and the body's performance of deeds, consistent with the commission as vicegerent on Earth, all according to Allah's will.

The word '**tafsir**' comes from Arabic word "fassar", which means, "to explain, to expound, to elucidate, to interpret." It means "the explanation or interpretation of something." In Islamic sciences, tafsir is defined to be the science by which the Qur'an is understood, its meanings explained, and its rulings derived.

Hadith in religious use is often translated as "tradition." In Islamic terminology, the term hadith refers to reports of statements or actions of Prophet Muhammad (peace and blessings be upon him), or of his tacit approval or criticism of something said or done in his presence. The word sunnah (custom) is also used in reference to a normative custom of the Prophet or the early Muslim community. Each hadith is

composed of two parts; a chain of authorities reporting the hadith (isnad), which would not stand the tests of "reliability" according to modern standards of historical analysis, and the text itself (matin). Hadiths are regarded by traditional Islamic schools of jurisprudence as important tools for understanding the Qur'an and in matters of jurisprudence.

The literal translation of **Fiqh** is "true understandings." In Islamic terms, Fiqh is the Islamic jurisprudence that makes rulings and judgments from evidence found in the Shariah, that is, the Qur'an and Sunnah, and from consensus of Islamic scholars. Fiqh does not necessarily come directly from the Qur'an and Sunnah. It does come indirectly from these sources. Fiqh does not override Shariah; it is used to form laws for matters not specifically addressed by the Shariah. It is divided into two parts; the study of the sources and methodology (usul al-fiqh—roots of the law) and the practical rules (furu' al-fiqh—branches of the law).

Tasawwuf can be called the inwardness of Islam. Islam, like most other faiths to a greater or lesser extent, consists firstly of certain beliefs, such as the existence of God, and the coming of the Judgment, and reward and punishment in the next life, and the outward expression of these beliefs in forms of worship, such as prayer and fasting, all of which concern man's relationship with God; and secondly, a system of morality, which concerns man's relationship with man, and has its outward expression in certain social institutions and laws, such as marriage, inheritance, and civil and criminal laws. It is obvious that the basis of this faith, the spirit that gives it life, is man's relationship with God. Forms of worship are simply the physical vehicles of this relationship, and it is this relationship again, which is responsible for the origin, the significance and the ultimate sanction of the principles of morality and their formulation into a specific social and legal system. If the interior converse with the Supreme Being and inspiration from Him are present, then they are comparable to the soul within the body of the exterior religion; if they die away, or in proportion to the extent that they wither or become feeble, the outward form of the faith becomes like a soulless body, which by the inexorable law of nature swiftly succumbs to corruption. It is, therefore, man's direct relationship with his Maker, which is the breath and life of religion and it is the study and cultivation of this relationship that the word tasawwuf connotes.[3] Tasawwuf is a very special training method that intends to prepare the members of the society to practice the orders in Qur'an, going in line with traditions of the Prophet (SAAW) and implementing the moral values of his companions.

2.2.2 Probable (Implicit) Sciences

In probable (implicit) sciences, the fact is not given to the mankind, but s/he seeks to find it using the wisdom and guidance of definitive sciences. Famous physicist Richard Feynman states that "*religion is a culture of faith; science is a culture*

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[3]http://www.masud.co.uk/ISLAM/misc/faridi.htm Retrieved 7 October 2016.

of doubt[4]". A famous saying of Albert Einstein was "*Science without religion is lame, religion without science is blind.*[5] "The fact of the probable science is elucidated by Albert Einstein as he said: "*The case is never closed; many experiments may prove me right, but it takes only one to prove me wrong*" [1]. Well-known French surgeon Maurice Bucaille[6] demonstrates the match between Qur'anic revelations and modern scientific findings with examples and he defines science and religion as twin brothers in Islam [2]. There are nine major branches of the probable sciences as shown in Fig. 2.2, with each branch having so many subbranches.

- Language
- Life sciences: Biology and medicine
- Economy
- Trade
- Psychology
- Sociology
- Physical Sciences
- Ratiocination sciences (mathematical sciences whose method is logical thinking)
- Cosmology, astronomy (study of celestial bodies) and earth sciences.

Language is the human capacity for acquiring and using complex systems of communication and by itself, it is the most specific element of such a system. The scientific study of language is called linguistics. Human language has the properties of productivity, recursivity, and displacement, and it relies entirely on social convention and learning. Its complex structure affords a much wider range of expressions than any known system of animal communication. There is a Confucius quote: "*If language is not correct, then what is said is not what is meant; if what is said is not what is meant, and then what must be done remains undone; if this remains undone, morals and art will deteriorate; if justice goes astray, the people will stand about in helpless confusion. Hence there must be no arbitrariness in what is said. This matters above everything.*"[7]

Humans acquire language through social interaction in early childhood, and children generally speak fluently when they are approximately three years old. The use of language is deeply entrenched in human culture. Therefore, in addition to its strictly communicative uses, language also has many social and cultural uses, such as signifying group identity, social stratification, as well as for social grooming and entertainment. Languages evolve and diversify over time, and the history of their

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[4]Richard Phillips Feynman (May 11, 1918–February 15, 1988) was an American theoretical physicist who received the Nobel Prize in Physics in 1965. In a 1999 poll of 130 leading physicists worldwide by the British journal Physics World he was ranked as one of the ten greatest physicists of all time. http://www.azquotes.com/quote/560084 Retrieved 8 June 2016.

[5]http://www.brainyquote.com/quotes/quotes/a/alberteins161289.html Retrieved 8 June 2016.

[6]https://en.wikipedia.org/wiki/Maurice_Bucaille Retrieved 18 October 2016.

[7]http://www.quotationspage.com/quote/14176.html Retrieved 8 June 2016.

evolution can be reconstructed by comparing modern languages to determine, which traits their ancestral languages must have had in order for the later stages to have occurred. A group of languages that descend from a common ancestor is known as a language family. The consensus is that between 50 and 90% of languages spoken at the beginning of the twenty-first century will probably become extinct by the year 2100. Annihilation of a nation starts with ruining of its language since improvements (paradigm shifts) stops.

The life sciences comprise the fields of science that involve the scientific study of living organisms—such as micro-organisms, plants, animals, and human beings—as well as related considerations like bioethics. Biology remains the centerpiece of the life sciences. The life sciences are helpful in improving the quality and standard of life. They have applications in health, agriculture, medicine, and the pharmaceutical and food science industries.

Biology is a natural science concerned with the study of life and living organisms, including their structure, function, growth, evolution, distribution, and taxonomy. Modern biology is a vast and eclectic field, composed of many branches and subdisciplines. However, despite the broad scope of biology, there are certain general and unifying concepts within it that govern all study and research, consolidating it into single, coherent field. In general, biology recognizes the cell as the basic unit of life, genes as the basic unit of heredity, and evolution as the engine that propels the synthesis and formation of new species. It is also understood today that all organisms survive by consuming and transforming energy and by regulating their internal environment to maintain a stable and vital condition.

Subdisciplines of biology are defined by the scale at which organisms are studied, the kinds of organisms studied, and the methods used to study them:

- Biochemistry examines the rudimentary chemistry of life;
- Molecular biology studies the complex interactions among biological molecules;
- Botany studies the biology of plants;
- Cellular biology examines the basic building block of all life, the cell;
- Physiology examines the physical and chemical functions of tissues, organs, and organ systems of a beast;
- Evolutionary biology examines the processes that produced the diversity of life; and
- Ecology examines how organisms interact in their environment.

Medicine is the field of applied science related to the art of healing by diagnosis, treatment, and prevention of disease. The word medicine is derived from the Latin *ars medicina*, meaning the art of healing. Medicine encompasses a variety of healthcare practices evolved to maintain and restore health by the prevention and treatment of illness in human beings. Contemporary medicine applies health science, biomedical research, genetics and medical technology to diagnose, treat, and prevent injury and disease, typically through medication or surgery, but also

through therapies as diverse as psychotherapy, external splints and traction, prostheses, biologics, pharmaceuticals, ionizing radiation among others.

Economy is balancing of producer goods, manufacturing and consumption. An economy or economic system consists of the production, distribution or trade, and consumption of limited goods and services by different agents in a given geographical location. The economic agents can be individuals, businesses, organizations, or governments. Transactions occur when two parties agree to the value or price of the transacted good or service, commonly expressed in a certain currency. In the past, economic activity was theorized to be bounded by natural resources, labor, and capital. This view ignores the value of technology (automation, accelerator of process, reduction of cost functions), and originality (new products, services, processes, new markets, expands markets, diversification of markets, niche markets, increases revenue functions), especially that which produces intellectual property. A given economy is the result of a set of processes that involves its culture, values, education, technological evolution, history, social organization, political structure and legal systems, as well as its geography, natural resource endowment, and ecology, as main factors. These factors give context, content, and set the conditions and parameters in which an economy functions.

Trade is exchange of a valuable good with another valuable one. It is also called goods exchange economy in addition to transfer the ownership of goods from one person or entity to another by getting something in exchange from the buyer. Trade is sometimes loosely called commerce or financial transaction or barter. A network that allows trade is called a market. The original form of trade was barter, the direct exchange of goods and services. Later one side of the barter was the metals, precious metals (coins), bill, and paper money. Modern traders instead generally negotiate through a medium of exchange, such as money. As a result, buying can be separated from selling or earning. The invention of money (and later credit, paper money and nonphysical money) greatly simplified and promoted trade. Trade between two traders is called bilateral trade, while trade between more than two traders is called multilateral trade.

Psychology is an academic and applied discipline that involves the scientific study of mental functions and behaviors. It has the immediate goal of understanding individuals and groups by both establishing general principles and researching specific cases, and by many accounts it ultimately aims to benefit society. In this field, a professional practitioner or researcher is called a psychologist and can be classified as a social, behavioral, or cognitive scientist. Psychologists attempt to understand the role of mental functions in individual and social behavior, while also exploring the physiological and biological processes that underlie cognitive functions and behaviors.

Sociology is the study of human social behavior and its origins, development, organizations, and institutions. It is a social science, which uses various methods of empirical investigation and critical analysis to develop a body of knowledge about human social actions, social structure, and functions. A goal for many sociologists is to conduct research which may be applied directly to social policy and welfare,

while others focus primarily on refining the theoretical understanding of social processes. Subject matter ranges from the micro level of individual agency and interaction to the macro level of systems and the social structure.

Physical sciences involve the study of physics and chemistry of nature and engineering applications. The foundations of the physical sciences rest upon key concepts and theories, each of which explains and/or models a particular aspect of the behavior of nature. According to **Physics**, the physical laws of matter, energy and the fundamental forces of nature govern the interactions between particles and physical entities (such as planets, molecules, atoms or the subatomic particles). **Chemistry**, built upon concepts from physics, addresses phenomena associated with the structure, composition and energetics of matter as well as the changes it undergoes. Often known as the central science, chemistry connects the fundamental laws of physics to engineering and other natural sciences such as biology, earth science, astronomy and material science.

Engineering is the application of scientific, economic, social, and practical knowledge in order to design, build, maintain, and improve structures, machines, devices, systems, materials, and processes. It may encompass using insights to conceive, model and scale an appropriate solution to a problem or objective. The discipline of engineering is extremely broad, and encompasses a range of more specialized fields of engineering, each with a more specific emphasis on particular areas of technology and types of application.

Ratiocination sciences deal with the reasoning and process of exact thinking; reason or logic to figure something out. It might involve determining probabilities, syllogisms, even mathematical formulas, or simply following all the steps in a process that you believe will lead you to the correct or best answer. This includes all mathematical sciences that rely on logical reasoning.

Cosmology is driven from the Greek κόσμος, kosmos "world" and -λογία, -logia "study of"). **Physical cosmology** is the scholarly and scientific study of the origin, evolution, large-scale structures and dynamics, and ultimate fate of the universe, as well as the scientific laws that govern these realities. It is studied by scientists, such as astronomers, and theoretical physicists; and academic philosophers, such as meta-physicians, philosophers of physics, and philosophers of space and time. Cosmology is also connected to **astronomy**, but while the former is concerned with the Universe as a whole, the latter deals with individual celestial objects.

Earth science is an all-embracing term for the sciences related to the planet Earth. It is arguably a special case in planetary science, the Earth being the only known life-bearing planet. There are both reductionist and holistic approaches to Earth sciences. The formal discipline of Earth sciences may include the study of the atmosphere, hydrosphere, oceans and biosphere, as well as the solid earth. Typically, Earth scientists will use tools from physics, chemistry, biology, chronology, and mathematics to build a quantitative understanding of how the Earth system works, and how it evolved to its current state.

2.3 Humanitarian Needs

2.3.1 Humanity; Senses and Emotions

The human being has been defined as "the responsible creature" in Fig. 2.1. He is not composed of the flesh, bones and blood only; he has been loaded with feelings as well. The feeling that has a special organ for it is called a **sense** (material feelings such as vision, hearing, touch, smell and taste) and those who do not have a special organ but involve all organs and cells of the body is called the **emotion** (spiritual feelings such as love, affection, hatred, grudge and animosity). All these feelings can be simple or compound. Tasting a food is a simple feeling while the appreciation of the need for a religious belief is a compound one.

Every individual owns four features at varying levels. The person can reach into the state of perfection by maturing of these features through proper education and training. These features are:

- **Lordship**: to own something. People want to have belongings that are owned by them only. If this feature becomes unruly, than people become greedy. They keep accumulating wealth and property without sharing with the needy. Improvement of the feature yields prosperous people who share their wealth with poor and needy as well as for the general welfare of their nations.
- **Predation**. A predator is by definition a "rapacious, exploitative person or group." If this feature is not treated properly and gets wild, then the person becomes brutal and can harm anybody. However, if it is well treated, then compassion and mercy will be the reflections on the behavior of the person for good and fair affairs, while harsh and stopping action for wrong doers.
- **Earthly desires**, also called the world of **animality**. It is a condition driven by instinct and lacking in reason, morality, or wisdom with which to control oneself. In this condition, one is ruled by the "law of the jungle," standing in fear of the strong, but despising and preying upon those weaker than oneself. Nevertheless, proper training of this feature will convert all negative attributes into positive ones; the person will abstain from unlawful acts and always observe the true path in his/her conducts.
- **Craftiness**. This is defined as being skilled in or marked by underhandedness, deviousness, or deception as illustrated in Fig. 2.3 in the cunning behavior of the fox.[8] Exaggeration of this feature yields people who doubt about everything and distrust everybody. The proper treatment is this feature will form people who can foresee events as if they see something beyond the solid walls. Accordingly, they can distinguish between good and evil, and take appropriate stance in advance.

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[8]http://www.thefreedictionary.com/craftiness Retrieved 8 June 2016.

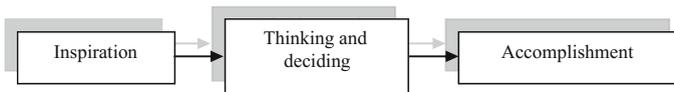**Fig. 2.3** Fox as an example of craftiness

Fig. 2.4 Three phases in occurrence of all events

2.3.2 Satisfaction of Feelings

All feelings, whether sense or emotion, simple or compound, must be satisfied for a healthy individual. Assume that somebody has closed your eyes with a band. How long can you bear it? You may think that you can tolerate it at the beginning, but after a while, you will intend to break the band to open your eyes! Why? Because it is a biological sense that is naturally available and it needs to be satisfied. However, you shall disturb neither your other senses and feelings nor those of the others in satisfying anyone of your feelings. You will look at something, yet you will not disturb either feelings of your family or the chastity of others.

All events that surround the life of an individual take place in three phases: the inspiration, thinking and deciding, and accomplishment as illustrated in Fig. 2.4. We are not responsible from the inspiration stage. Good or evil may come to the mind. A well-trained individual with fear of Allah will refrain from the evil and s/he will pursue to do the good. It is the thinking and deciding stage in which we are responsible from our intentions. For example, a person may be willing to own a car. Many things shall trigger the idea: needs for a car, jealousy of a friend, desire to show-off, etc. Then, the individual strives to own a car by using legitimate or illegitimate means. At the end, s/he will own a car, if it is predestined for him/her and at the predetermined time. This last point is the accomplishment stage for which we are not responsible either.

The activities that are carried out in the "**thinking and deciding**" phase is the most important ones from the responsibility point of view. The problem lies in the decision and a framework for systematic analysis is required. An activity may be planned solely with personal desires and it is called the **action**. If the activity is due to response to somebody else's work, then it is called the **reaction**. Nevertheless, an activity that is carried out after proper scientific investigations that yield forecasting of useful results is called the **deed**. As Muslims, we believe that all deeds are

according to intentions. The term intention involves thinking, judging and taking all necessary measures to accomplish the anticipated action. The result, however, may be fortune or disaster and it will be in accordance with Allah's willing. We can illustrate this point with an example.

> Two people from a village were critically ill and were carried to the town for treatment in the hospital. The first patient reached safely to the town and a surgeon in the hospital performed a surgical operation. The patient died during the surgery. A bunch of criminals stopped the group carrying the second patient. During the quarrel between the two groups, one of the gang stabbed the patient and he died as well. Eventually, both patients were stabbed and died. The gang was chased by the security forces and executed by hanging under a court ruling. Meanwhile, the surgeon claimed his salary although the patient did not survive the operation.

The Creator guides us to the optimum way of satisfaction; the way of satisfying all senses and emotions without disturbing your other feelings and feelings of the others is called the **Shari'a** (Muslim canonical laws). The **religion** is the name given to whole of the creed, deed (activities), intellectual, moral, and social principles that govern the life.

2.3.3 Three Types of Manner

The manner that we carry out in fulfilling an activity can be one of the three types: courage, bravery, and fearfulness. The **courage** is doing an activity to achieve a profit, benefit or advantage as well as prevent a damage or harm. The **bravery** doing an activity to attain a profit, benefit or advantage only while the **fearfulness** is doing it to prevent damage or harm only. The courage is the only acceptable manner from a wise person.

We take decisions and perform actions accordingly on the problems that we have to solve. We need knowledge, courage, and power as three essentials of any action. The knowledge and the courage are like two blades of a scissor and success of any scientific work relies on their sharpness and proper alignment as illustrated in Fig. 2.5. Without the power to operate, the blades have no use. Also, the three

Fig. 2.5 Components of performing an activity

components must come together in proper alignment so that they can work in harmony. The cement that binds the three essentials is the wisdom.

2.3.4 Rules of Interactions

There are four rules of interaction governing the human needs:

- **The law**: a system of rules established by an authority. Obeying the law is also a good manner and breaking the law causes punishment.
- **The etiquette** (good manner): contains codes of acceptable personal behavior and courtesy.
- **Morals**: accepted standards of right and wrong.
- **Ethics**: a code or system of rules defining moral behavior for a particular society. Ethics is considered within the general framework of morals. Ethical codes for several professions are established based on religious beliefs and/or ideas of philosophers. These codes are used to train the people in what is considered right and good, and judging their actions in case of any wrongdoing.

Every deed has two faces as the etiquette and the morals as illustrated in Fig. 2.6. The etiquette is the visible (material) side and the moral is the invisible (spiritual) side. They are like two faces of a coin. If one of the faces is ruined then the coin can be sold only at the value of its nickel. The morals side is the sincerity and devotion of the person in his deed and it affects the fidelity of the act. Eventually, s/he will be rewarded for his/her deed according to his/her devotion. The whole earth is the prayer hall (masjid) for a Muslim. Allah Almighty states in Al-Qur'an that nobody but Muslims can construct the prayer hall for His sake.[9] If we educate our citizens with the spirit of Islam and train them in practicing their religion correctly, then we do not have to worry about the ethics since their moral values cover them in full.

In Short…*To be a useful citizen who will let the society to progress*:

- We know what we do.
- We know why we do.
- We know how to do.
- We do it well.
- We can prove it.
- We receive input and feedback.
- We have a process to make continuous improvements.

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[9]Al-Qur'an; At-Tawba, 18.

Fig. 2.6 Morals and etiquette

2.4   Characterization of Education

2.4.1   Purpose of Education

The education as a way of giving and seeking knowledge is the most important asset for a human being as stated by Prophet Mohammed (SAAW):

> You should be a scholar, or a student, or a listener, or a lover of 'Ilm and scholars, and you should not be the fifth which makes you perish. (At-Tabarani; Al-Bazzar)

There are many other prophetic sayings are also full of references to the importance of knowledge. Sayings such as

> The acquisition of knowledge is obligatory upon every Muslim man and Muslim woman

and

> Go in quest of knowledge even unto China.

The quest of knowledge applies both the definitive (explicit) and probabilistic (implicit) sciences. These prophetic sayings have echoed throughout the history of Islam and incited Muslims to seek knowledge wherever it might be found. The possessor of knowledge or wisdom has been given a very precious and powerful gift. The acquisition of knowledge and understanding is something that should be done by everyone. This is why the scholars and teachers have always been held in the highest esteem in Islamic society.

The purpose of education is to achieve one or more of the following tenets:

- Produce citizens who live in harmony with their environments,
- Protect people against diseases,
- Cure people in diseases (bodily and spiritual),
- Let citizens to progress in the direction of the ultimate goal (which is the pleasure of Allah Almighty for a Muslim believer).

2.4.2 Role of Wisdom

It was stated in Chap. 1 that Allah Almighty granted the mankind with all the knowledge s/he needs to fulfill his/her responsibilities on earth at birth. However, this knowledge is covered and it must be unveiled. Hence, we do not create anything, rather we discover. The tool used in seeking knowledge is the wisdom. We must use it in the proper way; otherwise it may spoil the things. The wisdom is the source of responsibility provided that it is used properly. The knowledge may be granted directly by the Almighty in various forms. This is called the *innate knowledge*, but the owner of it cannot exercise it right away. *Gained knowledge* is the discovery from the one available in the soul via scientific methods. This will be used as a guide in our activities. Let us illustrate the distinction between innate and gained knowledge with a real-life example.

A young lady was found hanged in an old mill. A criminal case was filed and a thorough investigation was carried out. The result of the investigation indicated that the lady committed suicide. The judge was about to close the file. He had a dream in which the lady showed up. She told him that her husband took her from home with a cab with plate number … The cab took petrol from a petrol station and moved to the mill. Her husband hanged her and she would be suing the judge in the Hereafter unless he clarifies the case.

  The judge revived the case next morning and he wrote a letter to the security department and asked for an investigator with clean records to follow up the case starting from the cab and petrol station. The investigator was appointed and he quickly collected all evidences necessary to clarify that this was not a suicide, it was a murder. The husband had no way but to commit the crime and was put into jail.

The information that was given to the judge was the innate knowledge but he could not use it in his decision-making until it became gained knowledge through proper investigation. No science conflicts with the others; rather they support and complement each other. Sociology cannot ignore the beliefs; otherwise there will be disorders in the society.

2.4.3 Main Streams of Education

Education is the process of learning that can be defined as follows.

1. "a **persisting** change in human performance or performance potential … (brought) about as a result of the learner's interaction with the environment",
2. "the relatively **permanent** change in a person's knowledge or behavior due to experience",
3. "an **enduring** change in behavior, or in the capacity to behave in a given fashion, which results from practice or other forms of experience".

There are two mainstreams in education as teaching and training. Teaching is a process of imparting knowledge from a teacher a learner; most effectively identified as what, how and why. It has two major phases as the core education and advanced education. The core (fundamental) education infuses the custom of not harming anybody. The advanced (higher) education is a process to obtain the custom of being useful at all works and conducts. Training is to learn by heart and it is an organized activity aimed at imparting information and/or instructions to improve the recipient's performance or to help him/her attain a required level of knowledge or skill. It is also a way to gain the custom of protecting the truth, the good and the excellent in behaviors self and others.

- The **true**: the thought and the word check with the fact,
- The **good**: the true is used to provide a benefit,
- The **excellent**: the wording and actions shall be arranged in such a way that they relief a sorrow and provide pleasure.

Figure 2.7 shows the distinction between the true, the good and the excellent. In all our activities, whatever we say and/or do must be true. Among the true ones, we must look for the good ones and among the good ones we must search for the excellent.

The scientific knowledge is gained by a mature wisdom, true revelations, and correct observations. Teaching changes how we think. Training changes how we perform. Naturally, teaching and training are not mutually exclusive. In fact, training and teaching occur simultaneously in many instances, although some fields require more training than others.

2.4.4   Need for a Trainer

The education of a profession covers teaching and training essential to carry out the activities for that particular profession. Training is a way of infusing the habit of holding the truth, the goodness and the excellence in his/her deeds and deeds of others. The youngsters are formally educated in one of the application areas in a university/college in classrooms, scientific laboratories, and field studies. Training requires a trainer but teaching is expedited by a teacher. Characteristics of a trainer

Fig. 2.7 Relationship between qualities of behavior
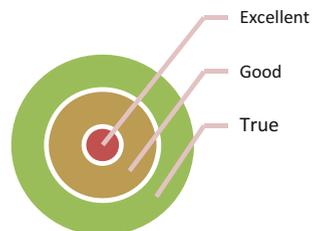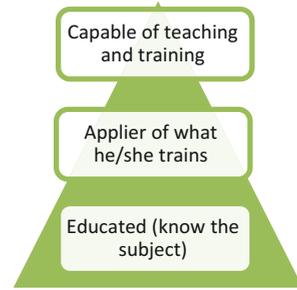
Excellent

Good

True

Fig. 2.8 Characteristics of a
trainer

are shown in Fig. 2.8. The trainer must be well educated in the field of the subject
that s/he is going to train others. Then, s/he must be applier of the subject.
Moreover, he/she must be capable of teaching and training the subject.

2.5   Scholastic (Educational) Status

2.5.1   Bloom's Taxonomy and Levels of Learning

Human being has been developing tools and techniques to extend his/her capa-
bilities in collecting information and fulfilling his/her duties in daily living. Engi-
neering can be defined as the development of technology and adapting it to the
society. However, while applying technology, great care must be exerted not to:
disturb the economy, upset the societal rules and orders, and destroy the
environment.

Taxonomy means classification, categorization, arrangement, or organization. It
is a hierarchical classification of student behaviors that reflects the development of
increasingly complex cognitive abilities and skills as a result of learning
experiences.

In 1956, Benjamin Bloom headed a group of educational psychologists devel-
oped a classification of levels of intellectual behavior important in learning. This is
later named as the Bloom's taxonomy and used for categorizing level of abstraction
of questions that commonly occur in educational settings. It provides a useful
structure in which to categorize test questions, since professors will characteristi-
cally ask questions within particular levels, and if you can determine the levels of
questions that will appear on your exams, you will be able to study using appro-
priate strategies. Bloom's taxonomy is now a classic system that classifies educa-
tional goals to facilitate the development and evaluation of college and university
curricula.

A paradigm shift in education started in late 70s in which the institutions
switched from content-based education to outcome-based education. Bloom's
taxonomy is considered a foundational and essential element within the education
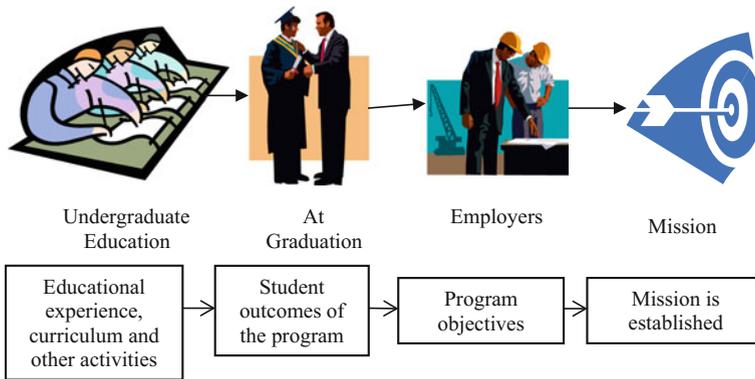
Undergraduate Education	At Graduation	Employers	Mission
Educational experience, curriculum and other activities	Student outcomes of the program	Program objectives	Mission is established

Fig. 2.9 Structuring of an academic program

community. Figure 2.9 illustrates the structuring of an academic program. The main idea is to adjust the academic programs to the institution's environment and needs. The beneficiaries of the programs are identified (such as students, academic staff, alumni, and employers of graduates) and they are consulted by various means. Then, each academic program defines the program missions (how we want to be seen by outsiders) and educational objectives (expected accomplishments of graduates during the first few years after graduation). Program outcomes (abilities and skills gained by students at the graduation) are drawn to satisfy the objectives and their foundations in courses are specified for each course, as course learning objectives (statements of observable student actions that serve as evidence of the knowledge, skills, and attitudes acquired in a course). Procedures for evaluating and measuring program outcomes must also be established. Consequently, program objectives are determined and periodically evaluated, and program outcomes are continuously monitored. Results are applied to continuously develop and improve the programs. Accreditation agencies audit the programs using the data on beneficiaries' desires, program design, and success of graduates in fulfilling the program objectives. Such an approach has the following salient advantages for the students:

- Increase the job potential in the local and international markets.
- Graduates desirous of higher education can easily seek admission in other international institutions.
- A continuous overall improvement process for the educational programs will assure keeping up with international standards.

During the 1990s, a new group of cognitive psychologists, led by Lorin Anderson (a former student of Bloom), updated the taxonomy to reflect relevance to 21st century work [3]. The revised taxonomy will be used in the proceeding sections.

**Fig. 2.10** Educational status
and domains of knowledge
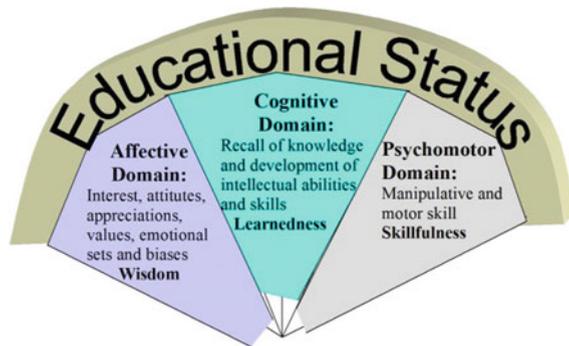
The educational status is an umbrella covering the attributes of the education. It contains three domains: affective (feeling/heart), cognitive (knowing/head), and psychomotor (doing/hands) as illustrated in Fig. 2.10.

1. The **affective domain** that has the interests, attitudes, appreciations, values, and emotional sets or biases;
2. The **cognitive domain** that is related to recall of knowledge and development of intellectual abilities and skills;
3. The **psychomotor domain** that deals with manipulative and motor skills.

2.5.2   Affective Domain (Attitudes)—Degrees of Internalization

The affective domain includes the manner in which we deal with things emotionally; such as feelings, values, appreciation, enthusiasms, motivations, and attitudes. It contains several stages as receiving, responding, valuing, organizing and characterizing by a value or value complex as indicated in Fig. 2.11.

- **Receiving**: Open to experience, awareness, and willingness to hear and passively accepting the knowledge. This is about the student's memory and recognition as well. It is the lowest level; the student passively pays attention. Without this level no learning can occur.
- **Responding**: React and participate actively; attending to and demonstrating compliance, willingness, or satisfaction in responding, and feeling comfortable from responding to requests, techniques, procedures and solutions. The student actively participates in the learning process and also reacts in some way, not only attends to a stimulus.
- **Valuing**: implementing the ideas and techniques in solving problems in general. It is based on the internalization of a set of values, and expressed in overt and identifiable behavior. The student associates a value or some values to the

Fig. 2.11 Affective domain
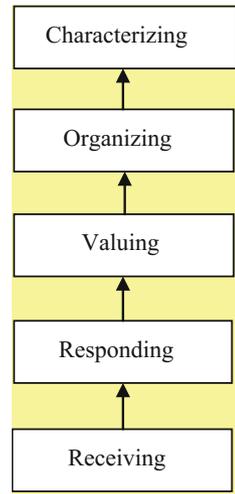
knowledge s/he acquired; s/he attaches a value to an object, phenomenon, or piece of information and expresses personal opinions.

- **Organizing or conceptualizing values**: Values are organized into priorities. The emphasis here is on comparing, relating, and synthesizing values in improving the status of our nation in line with the family and social values we have gained through our life. The student can put together different values, information, and ideas and accommodate them within his/her own schema; comparing, relating and elaborating on what has been learned. Eventually, s/he reconciles internal conflicts and develops a value system.
- **Characterizing** (internalizing) by a value or value complex that controls behavior: Behavior is pervasive, consistent, predictable, and characteristic of the values held. Solutions and decisions agree (or do not conflict) with the religious settings and moral values of the public. The student adopts a belief system and philosophy; holds a particular value or belief that now exerts influence on his/her behavior so that it becomes a characteristic.

The distinction between different stages is rather fuzzy. **The character**, which is reflected as honesty, integrity, and truthfulness, is also an attribute of the affective domain.

2.5.3 Cognitive Domain (Mental)—Levels of Learning

The activity of learning takes place at several stages as illustrated in the Fig. 2.12.

- **Remembering** (knowledge—information): Exhibit memory of learned materials by recalling facts, terms, basic concepts and answers. You can recall, collect material in suitable times. Answer questions like: "What are the health benefits of eating apples?" It includes

  - Knowledge of specifics—terminology, specific facts
  - Knowledge of ways and means of dealing with specifics—conventions, trends and sequences, classifications and categories, criteria, methodology
  - Knowledge of the universals and abstractions in a field—principles and generalizations, theories and structures.

- **Understanding** (comprehension): Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, extrapolating, giving descriptions, and stating the main ideas. Understand the meaning; re-state data in one's own words. Use ideas associated with a subject without relating them to other ideas and/or subjects. Answer questions like: "Compare the health benefits of eating apples versus oranges." It requires information level of knowledge.
- **Applying** (independent problem solving): Use or apply knowledge, put theory into practice, use knowledge in response to real circumstances. Solve problems in new situations by applying acquired knowledge, facts, techniques and rules in a different way. Answer questions like: "Which kinds of apples are best for baking a pie, and why?" It requires both knowledge and comprehension level of knowledge.
- **Analyzing** (breaking into components): Interpret elements, organizational principles, structure, construction, internal relationships; quality, reliability of individual components. Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. Can logically order components, ideas, theories, concepts, principles, techniques, procedures, etc., and separate these into their component parts or basic elements. Answer questions like: "List four ways of serving foods made with apples and explain which ones have the highest health benefits. Provide

Fig. 2.12 Cognitive domain
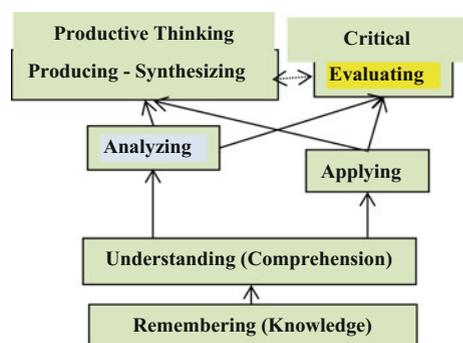
references to support your statements." It requires knowledge and comprehension.

- **Synthesizing** (producing—inventing): Develop new unique structures, systems, models, approaches, ideas; original thinking and operations. Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions. Assemble parts and elements into a unified organization or entirety that requires original or imaginative thinking. Answer questions like: "Convert an *unhealthy* recipe for apple pie to a *healthy* recipe by replacing your choice of ingredients. Explain the health benefits of using the ingredients you chose versus the original ones." This level requires knowledge, comprehension, application, and analysis. It can be briefed as,

  – Production of a unique communication
  – Production of a plan, or proposed set of operations
 – Derivation of a set of abstract relations.

- **Evaluating** (appreciating): Assess effectiveness of whole concepts, in relation to values, outputs, efficacy, viability; critical thinking, strategic comparison and review; judgment relating to external criteria. Present and defend opinions by making judgments about information, validity of ideas or quality of work based on a set of criteria. Hence, you gain the ability to judge and appreciate the values of ideas, concepts, principles, theories, techniques and procedures using appropriate criteria. It is the final stage of the critical thinking and it requires all previous levels of learning. Answer questions like: "Do you feel that serving apple pie for an after school snack for children is healthy?" There are two types of judgments involved

  – Judgments in terms of internal evidence
  – Judgments in terms of external criteria.

2.5.4   Psychomotor Domain (Levels of Physical Skills)

The psychomotor domain includes physical movement, coordination, and use of the motor-skill areas. Development of these skills requires practice and measurements in terms of speed, precision, distance, procedures, or techniques in execution. Bloom and his/her colleagues never generated subcategories for skills in the psychomotor domain, but since then other educators have formed their own psychomotor taxonomies [4]. Some authors use seven levels from perception to origination while some others have only five levels skipping the two. The detailed one is illustrated in the pyramid in Fig. 2.13 and summarized below.

1. **Perception**: The ability to use sensory cues to guide motor activity. This ranges from sensory stimulation, through cue selection, to translation.

Fig. 2.13 Psychomotor domain
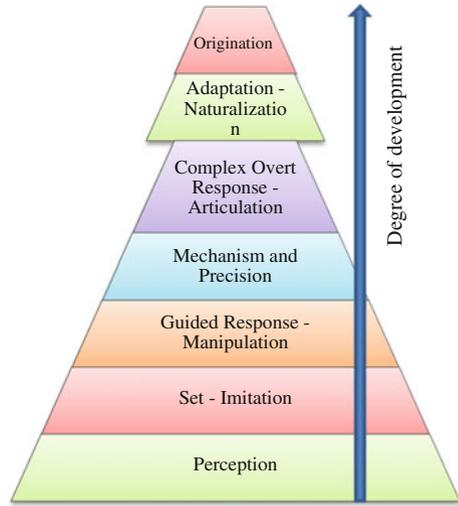
- **Examples**: Detects nonverbal communication cues. Estimate where a ball will land after it is thrown and then moving to the correct location to catch the ball. Adjusts heat of stove to correct temperature by smell and taste of food. Adjusts the height of the forks on a forklift by comparing where the forks are in relation to the pallet.

- **Key Words**: chooses, describes, detects, differentiates, distinguishes, identifies, isolates, relates, selects.

2. **Set and Imitation**: Readiness to act and copy action of another; observe and replicate. It includes mental, physical, and emotional sets. These three sets are dispositions that predetermine a person's response to different situations (sometimes called mindsets).

   - **Examples**: Knows and acts upon a sequence of steps in a manufacturing process. Recognizes one's abilities and limitations. Shows desire to learn a new process (motivation). Note: This subdivision of Psychomotor is closely related with the "Responding to phenomena" subdivision of the Affective domain.
   - **Key Words**: begins, displays, explains, moves, proceeds, reacts, shows, states, volunteers.

3. **Guided Response—Manipulation**: Reproduce activity from instruction or memory as early stages in learning a complex skill. The early stages in learning

a complex skill that includes imitation and trial and error. Adequacy of performance is achieved by practicing.

- **Examples**: Performs a mathematical equation as demonstrated. Follows instructions to build a model. Responds to hand-signals of instructor while learning to operate a forklift.
- **Key Words**: copies, traces, follows, reacts, reproduces, and responds.

4. **Mechanism and Precision**: Intermediate skill in learning a complex skill that includes habituation and proficiency in executing the skill reliably and independent of help. The action is quick, smooth, and accurate. Learned responses have become habitual and the movements can be performed with some confidence and proficiency.

- **Examples**: Using a personal computer. Repairing a leaking tap. Driving a car.
- **Key Words**: assembles, calibrates, constructs, dismantles, displays, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches.

5. **Complex Overt Response—Articulation**: The skillful performance of motor acts that involve complex movement patterns. Proficient in speed and accuracy: Adapt and integrate expertise to satisfy a new context or task. Proficiency is indicated by a quick, accurate, and highly coordinated performance, requiring a minimum of energy. This category includes performing without hesitation, and automatic performance. For example, players will often utter sounds of satisfaction or expletives as soon as they hit a tennis ball or throw a football, because they can tell by the feel of the act what the result will produce.

- **Examples**: Maneuvers a car into a tight parallel parking spot. Operates a computer quickly and accurately. Displays competence while playing the piano. Key Words: assembles, builds, calibrates constructs, dismantles displays, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, and organizes sketches.
- Note: The **Key Words** are the same as Mechanism, but will have adverbs or adjectives indicating that the performance is quicker, better, more accurate, etc.

6. **Adaptation—Naturalization**: Skills are well-developed and the individual can modify to fit special requirements. Instinctive, effortless, unconscious mastery of activity and related skills at strategic level.

- **Examples**: Responds effectively to unexpected experiences. Modifies instruction to meet the needs of the learners. Perform a task with a machine

that it was not originally intended to do (machine is not damaged and there is no danger in performing the new task).

  – **Key Words**: adapts, alters, changes, rearranges, reorganizes, revises, varies.

7. **Origination**: Producing new movement patterns to fit a particular situation or specific problem. Emphasis on synthesis based on highly developed skills. Learning outcomes emphasize originality based upon highly developed skills.

  – **Examples**: Constructs a new theory. Develops a new and comprehensive training programming. Forms a new gymnastic routine.
  – **Key Words**: arranges, builds, combines, composes, constructs, designs, forms, initiate, makes, originates.

2.6 Wisdom and Intelligence

All sciences are learned through the wisdom. Wisdom was expressed in Chap. 1 and it can be briefly stated as the ability to think, investigate, and evaluate the events and relations between events. It is neither the memory nor the intelligence only. The intelligence is the ability to see the interactions and relations between various things. Howard Gardner (1983) defines intelligence as the capacity of solving problems and producing solutions to solve problems, ability of adding valuable cultural products to the society. He proposed a theory of multiple intelligence in which the intelligence is not a single dimensional quantity. On the contrary, every individual has different capabilities and intelligences in various forms and levels. He stated eight types of intelligences as briefed below [5].

2.6.1 Eight Ways of Knowing

Logical-Mathematical Intelligence: The knowing that occurs through the process of seeking and discovering patterns and through problem solving. It uses such tools as calculation, thinking skills, numbers, scientific reasoning, logic, abstract symbols, and pattern recognition.

Visual-Spatial Intelligence: The knowing that occurs through seeing both externally (with the physical eyes) and internally (with the mind's eye). It uses such tools as drawing, painting, sculpture, collage, montage and visualization, imagination, pretending, and creating mental images.

Bodily-Kinesthetic Intelligence: The knowing that occurs through physical movement and performance (learning by doing). It employs such tools as dance,

drama, physical games, mime, role-play, body language, physical exercise, and inventing.

Musical-Rhythmic Intelligence: The knowing that occurs through hearing, sound, vibrational patterns, rhythm, and tonal patterns, including the full range of potential sounds produced with the vocal chords. It utilizes such tools as singing, musical instruments, environmental sounds, tonal associations, and the endless rhythmic possibilities of life.

Naturalist Intelligence: The knowing that occurs through encounters with the natural world that involve appreciation for and understanding of the various flora and fauna, recognition of species membership, and the ability to relate to living organisms. It uses such tools as hands-on labs, field trips, sensory stimulation, and attempts to classify and comprehend natural patterns.

Interpersonal Intelligence: The knowing that occurs through person-to-person relating, communication, teamwork, and collaboration. It employs such tools as cooperative learning, empathy, social skills, team competitions, and group projects that foster positive interdependence.

Intrapersonal Intelligence: The knowing that occurs through introspection, metacognition (thinking about thinking), self-reflection, and "cosmic questioning" (What is the meaning of life?) It uses such tools as affective processing (of, or arising from affects or feelings), journals, thinking logs, teaching for transfer, higher-order thinking, and self-esteem practices.

Verbal-Linguistic Intelligence: The knowing that occurs through the written, spoken, and read aspects of language as a formal system. It uses such tools as essays, debates, public speech, poetry, formal and informal conversation, creative writing, and linguistic-based humor (riddles, puns, jokes).

2.6.2   Intelligence and Inherited Wealth

Everybody is a genius, but very few people are aware of this fact. Furthermore, the intelligence is sharpened as you make use of it and it becomes blunted if you do not take advantage of it. Here, the willingness and motivation of the person and hard work to achieve a predestined result are major contributors to the improvement of the intelligence. The relaxed and lazy attitude due to richness of supporting resources and comfortable life style are factors that generally affect the intelligence negatively. This is exemplified by the following case study.

The market value of all officially recognized final goods and services produced within a country in a year, or other given period of time is called **Gross Domestic Product** (GDP). GDP measures the total output produced within a country's borders—whether produced by that country's own local firms or by foreign firms. It is related to national accounts, a subject in macroeconomics and it should not to be confused with **Gross National Product** (GNP), which allocates production based on ownership GDP per capita is often considered an indicator of a country's standard of living. GDP per capita is not a measure of personal income, rather under economic theory; it exactly equals the gross domestic income (GDI) per capita.

The **Organization for Economic Cooperation and Development**, or OECD, carries out tests every two years in mathematics, science and reading comprehension skills of 15-year-olds in 65 countries around the globe (excluding Africa), called the **Program for International Student Assessment**, or PISA. In the 2012 study, it came out with a fascinating little study mapping the correlation between performance on PISA exam and the total earnings on natural resources as a percentage of GDP for each participating country. Countries, which have almost no natural resources (such as Singapore, Taiwan, and Thailand), score high while those that rely mostly on the natural resources (such as Saudi Arabia) score low in the PISA test [6]. In short, how well do our high school kids do on mathematics compared with how much oil we pump or how many diamonds we dig?

Everything possible must be exercised to ensure that more people in our society discover this fact and best utilize their ingenuities. The first step is to learn how to stand on their feet. This is however only possible by;

- Getting rid of the complexity of inferiority,
- Working hard to obtain the knowledge and gain the experience,
- Targeting continuous improvement.

The next stage of development is to become self-sufficient. Then we set our own rules and standards. We aim for the best for our society and strive to improve our society materially and spiritually. Once we achieve this, then we become example to others and the know-how provider. These points coincide with **key elements of Japanese success** that can be stated as

- Elimination of waste,
- Respect to the people,
- Kaizen—continuous improvement.

2.7 Recapitulation

2.7.1 Summary of Foundations of Science

All the sciences and technologies must be committed to serve humanity. Hence' it is essential to know who the human being is. According to divine sources, the human being is a special creature who is responsible in implementing the rules of the Creator on Earth. S/he will be either punished or rewarded in the Hereafter according to his/her sincerity in fulfilling his/her duties. Sciences can be divided into two broad categories as definitive (explicit) and probable (implicit) sciences. In definitive sciences the fact is given by the Lord and the human being tries to understand it and apply it in his/her life using the intelligence and wisdom bestowed to him/her. In the probable sciences however, the fact is not given and s/he tries to

discover it through the guidance of the wisdom. Each category has several branches that have specific methods of study developed for achieving the scientific knowledge.

The human being is loaded with senses and emotions, each of which requires satisfaction. The best way of satisfaction is the one that does not disturb either his/her other senses or feelings of others and it is specified by the Lord of Earth and Heavens as the Shari'a (canonical laws for Muslims). Education is a way of teaching individuals how to live in harmony with the environment and train them how to become useful citizens. Educational (scholastic) status of an individual is determined according to his/her competencies in three domains of knowledge. The cognitive domain is related to recall of knowledge and development of intellectual skills. The psychomotor domain deals with manipulative and motor skills. The affective domain has interests, appreciations, values, and emotional sets or biases. As such, it is the degree of internalization and it sets the character of the person.

The ability of a person to think, investigate and evaluate the events and relations between events is called the wisdom. The intelligence is the ability to seen the interactions and relations between various stuffs and it is an essential ingredient of the wisdom. Each individual has different capabilities and intelligences in various forms and levels. You can maximize the benefits of education if you can discover the type of intelligence that the person owns and accordingly adopt educational technologies to suit his/her requirements. Furthermore, the intelligence is sharpened as you make use of it and it becomes blunted if you do not take advantage of it. Here, the willingness and motivation of the person and hard work to achieve a predestined result are major contributors to the improvement of the intelligence.

2.7.2 Review Questions

1. What is the place of mankind among other creatures?
2. What is life and what are the phases?
3. What are the responsibilities and privileges of people in this world?
4. What is the most appealing difference between definitive and probable sciences?
5. Describe the role of reasoning in definitive and probable sciences.
6. Briefly describe the main branches of definitive sciences and the objectives of each branch.
7. List the main branches of the probable sciences.
8. Express the importance of language in terms of education, society and culture.
9. A scientist in any branch of science needs to be informed in other branches of the sciences in order to make a healthy decision. Describe this necessity with examples.
10. Demonstrate the supportive relationships between the biological sciences and the physical sciences with examples.
11. Describe the human senses and feelings.

12. Illustrate the need for satisfaction of all the senses and the feelings as ln as they are available.
13. Define the most appropriate way to satisfy the feelings.
14. Describe the prime elements of decision-making and scrutinize the degree of responsibility of the people in deciding.
15. Explain the rules of interaction in a civilized society.
16. Interpret the relationship between ethics, morality and law.
17. Describe the necessity of having the etiquette and moral together in an activity with examples.
18. State the purpose of education.
19. Indicate the reasons for the requirement of trainers in education, and describe the qualities required to be included in the trainer to be successful.
20. Explain with examples how a person can apply the true, good and excellence in his behavior.
21. Describe innate knowledge and gained knowledge, and investigate thoroughly and explain how they can affect the person in decision-making.
22. Show outlines of the design of an academic program.
23. Describe how the educational status and wisdom can be measured.
24. Explain the importance Bloom's taxonomy in education.
25. Assess the levels of the affective domain (the degree of internalization).
26. Describe the levels of cognitive (mental) domain and relationships between them.
27. Describe the psychomotor domain and list its prevailing stages.
28. Define the concepts of intellect (wisdom), intelligence and memory, and the relationships between them.
29. Identify the fields of intelligence, and explain the interactions with the disciplines specified in the classification of the sciences.
30. Investigate the effects of the intelligence and the inherited wealth in development of the society, and suggest ways of rectifying their adverse effects through proper education.

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