CHAPTER 3.

SOME PORTIONS OF

DOOYEWEERD'S POSITIVE PHILOSOPHY

This chapter explains some portions of Dooyeweerd's positive philosophy which author has found useful in understanding IS. It covers Dooyeweerd's theory of modal spheres (aspects), his theory of things, his theory of knowing, experience and assumptions, and, on the basis of these, it draws together his approach to everyday life. What it does not cover is his notion of cosmic time and the relationship between the self and the Divine, nor his extensive discussion of the State. As a result of its different flavour, Dooyeweerd's philosophy is able to give due respect to ontology, epistemology, philosophical ethics, methodology and anthropology.

3.1 DOOYEWEERD'S THEORY OF MODAL ASPECTS

If you were to reflect on what you are doing now, reading this, you would most probably agree that there is a lingual aspect to what you are doing. You would probably agree there is also a biotic aspect -- you are breathing, digesting food, etc. Generosity in your reading, overlooking the mistakes in style, grammar or spelling you might encounter might be yet another aspect.

What aspects might there be? Is there an infinite number of possible aspects? If not, what are they, and why is there only a limited set? How should they be identified? Are the aspects of what you are doing now also aspects of what someone else might do? Can we agree on sets of aspects? And why does it matter; what does the notion of aspects do for us? These are the kinds of questions that Dooyeweerd reflected upon, and which his theory of modal aspects tries to address.

Regardless of what aspects might be delineated, what are aspects as such? Webster's Dictionary [1971] defines aspect, in roughly the sense meant here, as "a particular status or phase in which anything appears or may be regarded" and Clouser [2005,p.267] defines aspect as "a basic kind of properties and laws". But Dooyeweerd himself introduced aspects without definition and in a way that appeals to our intuition, only later gradually exposing their nature. (This may have been not only because of his respect for everyday experience, but because they are the law-framework by which we not only exist and function but also know, think and define, so they are ultimately beyond exhaustive definition, and we must carefully discover their nature.) We will follow Dooyeweerd here, introducing Dooyeweerd's suite of aspects before outlining more precisely what aspects are and what they do for us philosophically.

3.1.1 Dooyeweerd's Suite of Aspects

Dooyeweerd delineated fifteen aspects of our everyday experience. The first page of his [Dooyeweerd, 1984,I] has:

> "A indissoluble inner coherence binds the numerical to the spatial aspect, the latter to the aspect of mathematical movement, the aspect of movement to that of physical energy, which itself is the necessary basis of the aspect of organic life. The aspect of organic life has an inner connection with that of psychical feeling, the latter refers in its logical anticipation (the feeling of logical correctness or incorrectness) to the analytical-logical aspect. This in turn is connected with the historical, the linguistic, the aspect of social intercourse, the economic, the aesthetic, the jural, the moral aspects and that of faith."

Though Dooyeweerd defended this list, he was usually cautious about presenting it systematically, for reasons discussed later. But we will do so, for clarity and for later reference.

Dooyeweerd was not consistent in the names he gave the fifteen aspects in his suite, so the following list gives the names used throughout this work. Each aspect is a sphere of meaning, centred on a kernel meaning:

- Pistic aspect, of faith, commitment and vision.
- Ethical aspect, of self-giving love, generosity, care
- Juridical aspect, of 'what is due', rights, responsibilities
- Aesthetic aspect, of harmony, surprise and fun
- Economic aspect, of frugality, skilled use of limited resources
- Social aspect, of social interaction, relationships and institutions
- Lingual aspect, of symbolic meaning and communication
- Formative aspect, of history, culture, creativity, achievement and technology
- Analytical aspect, of distinction, conceptualizing and inferring
- Sensitive (or psychic) aspect, of sense, feeling and emotion
- Biotic (or organic) aspect, of life functions, integrity of organism
- Physical aspect, of energy and mass
- Kinematic aspect, of flowing movement
- Spatial aspect, of continuous extension
- Quantitative aspect, of amount

This list of aspects and their kernel meanings has been compiled by taking account of what is said about them in many places in Dooyeweerd's writings and that of others. Note that they are listed in the reverse order from the earlier list, from what Dooyeweerd called the latest (pistic) to the earliest (quantitative), in order to avoid any connotation that the quantitative aspect can be treated as a self-sufficient foundation for the rest.

Surrounding the kernel of each aspect is in fact a complex constellation of meaning, of which the lists below give examples of properties, relations, things, processes, events, norms and the like. All things within our experience -- whether dynamic or static -- make

sense by reference to one or more of the aspects.

Meaningful within the quantitative aspect are properties like more, less, many, few, and such things as: amount, quantity, counting, addition, subtraction, multiplications, divisions, fractions, proportions, means, standard deviations.

Meaningful within the spatial aspect are properties like large, small, near, far, surrounding, overlapping, and such things as: size, length, direction, slope, angle, dimension, axes, position, shape, area, geometry, topology.

Meaningful within the kinematic aspect are properties like fast, slow, and such things as: movement, rotation, speed, velocity, rotational velocity, flow, route. The kinematic aspect is concerned with movement without any cause, and thus does not include acceleration.

Meaningful within the physical aspect are concepts like mass, force, charge, momentum, and such things as: energy, fields, flux, acceleration, attraction, repulsion, causality, interaction, quanta, light, gravity, resistance, inverse square law, material, crystal structure, atoms, sub-atomics, gases, liquids, solids, plasmas, diffusion, solution, precipitation, chemical reaction, erosion, vibration, transmission, and so on, and properties and relationships relating to these -- almost anything that might validly be studied in quantum physics, physics, chemistry or materials science.

Meaningful within the biotic (organic) aspect are properties like alive, dead, healthy, young, old, and such things as: respiration, digestion, secretion, excretion, growth, decay, repair, healing, reproduction, cells, tissues, organs, organisms, ecology, species, genera, phyla, food chains, thriving, survival, competition, evolution, adaption, and so on.

Meaningful within the sensitive (psychic is another name) aspect are properties like red, salty, hot, fearful, angry, tired, and such things as: feeling, sensing, responding, emotion, nervous system, sense and motor organs, nerve impulses, excitation, spreading activation, memory, recognition, and so on, with all the related properties, operations, processes, and so on. The sensitive aspect covers both sensory-motor functioning and emotions, such as occur in animals.

Meaningful within the analytic aspect are properties like distinct, confusing, (il)logical, contradictory, and such things as: concepts, clarity, exclusion, logic, operations like deduction, analysis, and so on.

Meaningful within the formative aspect are such things as: forming, shaping, constructing, achieving, goals, means and ends, targets, structure, relationship, method, technique, skill, technology, history, culture (as human shaping as in agriculture, horticulture, rather than as in high culture or social culture), and so on. (Dooyeweerd sometimes called this the cultural or historical aspect.)

Meaningful within the lingual aspect are properties like legible, understandable, expressive, and such things as symbol, signification, representation, expression, letters, phonemes, words, phrases, sentences, documents, writing, speaking, waving, language, text, diagram, jotting, scribbling, notes.

Meaningful within the social aspect are properties like respect, status, class, esteem, friendship, leadership, social authority and submission, social structures, grouping, institution, community, society, agreement, discourse, meeting, friendship, enmity, and the like.

Meaningful within the economic aspect are properties like costly, frugal, extravagant, and such things as resource, limitation, budget, deadline, cost, exchange (and barter, buying, selling), consumption, production, management, business, and the like.

Meaningful within the aesthetic aspect are properties like harmonious (as in music), beautiful, surprising, boring, enjoyable, funny, and such things as counterpoint, rhythm, style, nuance, balance, humour, jokes, interest, leisure, play, sport, art, music, theatre, and so on.

Meaningful within the juridical aspect are properties like (un)just, appropriate, reasonable, and such things as due, rights, responsibility, oppression, emancipation, laws and legal systems, retribution (whether reward or punishment), policing, policy, government, the state, the legislature, and so on.

Meaningful within the ethical (attitudinal) aspect are properties like generous, self-giving, selfish, and such things as love, generosity, sacrifice, voluntary, attitude, altruism, "going the second mile", "looking after number one", and so on.

Meaningful within the pistic aspect are properties like faithful, loyal, committed, and such things as vision, morale, hope, deep belief, deep trust, religion, creed, idolatry, worship, and so on. This is sometimes called the credal or faith aspect.

It is important not to confuse the concrete things or events that are meaningful by reference to an aspect (what Dooyeweerd [1984,I,p.3] called the ’what’) with the aspect itself, which is a way (a ’how’) in which the things might be meaningful. The lists above present adjectives, followed by nouns concepts (things or processes) particularly attached to this aspect rather than others. The nature of this attachment is explained later as ’qualifying aspect’.

Many things are of multiple aspects. For example digits are lingual signs with strong quantitative meaning. For example, an idiom is of the lingual aspect, but it has a strong social aspect because its meaning depends on the writer and reader sharing social or cultural assumptions. Some concepts in common use have several meanings. For example, the word ’debt’ is usually given economic meaning, but it may also be used juridically, when something remains due to

another. Frequently, one is a kernel meaning, the other analogical.

3.1.2 Other Recognition of Aspects

It is very natural to think aspectually, whenever we delineate a set of things that should be taken into account separately from each other and not reduced to each other. Usually we do so informally, as in Adam [1998,p.180]: "The way that a number of aspects of knowing are not reducible to propositional knowledge, but rely instead on some notion of embodied skill, points to the role of the body in the making of knowledge." While many use the word 'aspects', others use other words. Maslow [1943] offers his hierarchy of needs. Dahlbom and Mathiassen [2002,p.135] have three types of quality: functional, aesthetic and symbolic. Heidegger spoke of regional ontologies. Even Foucault's regimes of truth might be centred on aspects.

Table 3.1.2 Some suites of aspects

Aspect	Maslow	Husserl	Hartmann	Bunge	Habermas
Quant'ive					
Spatial					
Kinematic					
Physical		Material	Inorganic	Physical, Chemical	
Biotic	Biological	Material	Organic	Biological	
Psychic	Safety	Psychological	Psychic		
Analytic	Enquiry				
Formative			Historical	Technical	Instrumental, Strategic
Lingual	Expression				Communicative
Social	Affiliation, Esteem	Social	Supra-individual	Social	(Strategic)
Economic					
Aesthetic	Aesthetic				Dramaturgical
Juridical					Normatively regulated
Ethical					
Pistic	Transcendence, Self-actua-lization				

Some try to identify aspects more formally. Husserl suggested there are three aspects: material, psychological and social -- which is a very common set. To Husserl [1970,p.233-4] it was important to distinguish the psychological aspect from the physical and believed that Brentano was prevented from doing so by his 'prejudices'. Hartmann believed there are four 'strata': inorganic, organic, animal-psychic and supraindividual-cultural, and possibly the historical is a fifth. Bunge [1979] omits the psychological, splits the material into physical, chemical and biological, and adds a technical. Habermas

identified five action types. Table 3.1.2 allows comparison of several sets of aspects with Dooyeweerd's. To a large extent, they accord reasonably well with Dooyeweerd's, as a subset, and, if any order is given, this is usually approximately the same order as Dooyeweerd's. Dooyeweerd warned against claiming any absolute truth for any suite, and later the extent to which his suite may be trusted (and hence adopted and used) is discussed.

3.1.3 More than Categories

Most thinkers treat aspects as little more than categories that are irreducible to each other. Hartmann's [1952] discussion in his 'new ontology' was somewhat more sophisticated than most, in particular discussing the bearer-borne relationship between aspects ('strata') and a normative concept of 'perfection' in each. But as Seerveld [1985] showed, in his comparison between Hartmann and Dooyeweerd, Dooyeweerd went further. According to Henderson [1994,p.37-8], Dooyeweerd recounted shortly before his death in 1977 how the shape given to his idea of aspects occurred to him:

> "It does sound strange" he says, "but it is really true that the direction in which I worked out my philosophy and my encyclopedia of jurisprudence has no predecessors. I can still reconstruct how I got its basic idea. .. I enjoyed going for walks in the dunes in the evening. During one of these walks in the dunes I received an insight (ingeving) that the diverse modes of experience, which were dependent upon the various aspects of reality, had a modal character and that there had to be a structure of the modal aspects in which their coherence is reflected. The discovery of what I called 'the modal aspects of our experience horizon' was the point of connection."

To him aspects are spheres of meaning and law that constitute the law side (§2.4.4). Nothing can exist or occur in the cosmos without them, and they account for the diversity and coherence of that being and occurrence.

Aspects form an enabling framework that enables the entire cosmos to Be and Occur, meaningfully and 'good' (that is, to be sought rather than avoided). The cosmos includes not just physical things and occurrences, but conceptual, social, moral, and so on. Poems, programs, people and policies, for example, are part of this meaning-and-law-enabled cosmos.

Each aspect is some kind of origin, not an absolute Origin, but that which enables being, doing, knowing, and the like. Heidegger [1971] seems to have understood something similar:

> "Origin here means that from and by which something is what it is and as it is. What something is, as it is, we call its essence or nature. The origin of something is the source of its nature." [p.17]

Heidegger continued, concerning art:

> "The question concerning the origin of the work of art asks about the source of its nature. On the usual view, the work arises out of and by means of the activity of the artist. But by what and whence is the artist what he is? By the work; for to say that the work does credit to the master means that it is the

> work that first lets the artist emerge as a master of his art. The artist is the origin of the work. The work is the origin of the artist. Neither is without the other. Nevertheless, neither is the sole support of the other. In themselves and in their interrelations artist and work are each of them by virtue of a third thing, which is prior to both, namely that which also gives artist and work of art their names -- art."

To Dooyeweerd, the aesthetic aspect is that 'third thing' which is prior to both: a source of the nature of works of art and also that by which the artist is artist.

But Heidegger, trapped in the immanence-standpoint [Dooyeweerd, 1984,I,p.112], did not allow himself to conceive of a law side, so he could not develop this theme as far as Dooyeweerd did. In Dooyeweerd's extensive treatment in Volume II several philosophical characteristics of aspects and several ways in which aspects fulfil this role of 'origin' (philosophical roles) may be discerned which will prove useful in formulating frameworks for understanding IS.

3.1.4 Characteristics of Aspects

What characteristics thinkers believe aspects to have is to a large extent determined by religious presuppositions. Dooyeweerd developed his view presupposing CFR, and, though he did not set these out systematically, we can find throughout his writings the following characteristics of aspects.

3.1.4.1 Pertinence of aspects

The aspects, as a framework of meaning-and-law that enables the cosmos, transcends the entire cosmos. This means the aspects pertain, across all situations, all cultures, all times, whether we acknowledge or understand them, or not. This is especially important, for example, in understanding unexpected impacts of computer use (chapter 4).

3.1.4.2 Irreducibility

Aspects are irreducibly distinct in respect of their meaning. Irreducibility, usually called sphere sovereignty by Dooyeweerd, is a stronger notion in Dooyeweerd than in most thinkers. It means that no aspect can be eliminated in favour of another, neither by declaring it to be a figment nor by treating it as essentially the same as another, and no aspect 'causes' another. For example, the psychic aspect cannot be reduced to the physical nor the juridical to the social, lingual or ethical: justice (meaningful in the juridical aspect) cannot be reduced to discourse (lingual-social) or even to morality (ethical). Clouser [2005] explains Dooyeweerd's notion well. Reducing one aspect to another gives rise, over a period, to major problems in philosophy, such as antinomy. In research and practice, aspectual irreducibility has other implications, providing philosophical grounds for understanding diversity, delineating distinct horizons of meaning, helping us to avoid overlooking important factors and fostering and guiding interdisciplinary thinking. Every aspect is important: none can be dismissed as less meaningful, less interesting, or deserving of

less of our attention.

3.1.4.3 Harmony of aspects

Dooyeweerd contended [1984,II,p.3] that there is no antinomy between aspects. Because the laws of one sphere are irreducible in their meaning to those of another, there cannot, by definition, be any inherent antinomy (Greek root: against-law) between them. Any apparent disharmony (for example as assumed between ethical and economic in "Being too ethical jeopardises the success of business") occurs, argued Dooyeweerd [1984,II,p.334,ff.], because of the immanence-standpoint. In IS, for example, the late Enid Mumford seemed to believe in it (see §4.4.3). But, by the same irreducibility, we do experience a healthy tension when we try to pull the aspects apart by thinking about their meaning (see later).

3.1.4.4 Non-absoluteness of aspects

Though the aspects constitute the enabling framework for the temporal cosmos, no aspect is absolute, in the sense that no aspect can be the foundation for all the others, and that no aspect has its full meaning within itself. Rather each refers beyond itself (which is the nature of meaning discussed in chapter 2). Dooyeweerd mentioned three ways in which an aspect refers beyond itself [1984,III,p.632]:

> "The idea of meaning-modality points above itself to the temporal coherence of all the modal spheres and to the fulness of meaning in the transcendent religious root and to the Origin of the creation."

The first is of most interest here, in that it implies that each aspect refers to, or relates to each of the others, either before or after it; see below. Reductionism absolutizes an aspect (e.g. rationalism absolutizes the analytic). If we absolutize an aspect we treat that aspect as of overriding importance, as the only aspect that should be considered, as able in principle to achieve all we want, and we defend it. Absolutization fundamentally affects the research questions we pose and seek to answer in that the research community is driven to see everything as an extension of the meaning of that aspect, and to try to justify everything in terms of that aspect. It prevents a true interdisciplinary attitude. Most immanence philosophy has tended towards absolutization of one aspect or another. Non-absoluteness is not a deficiency but a positive motivator to love, joy, beauty and shalom in the Cosmos.

3.1.4.5 Anticipation and Retrocipation

But giving too much emphasis to the irreducibility of aspects can lead to fragmented views. Dooyeweerd was clear [1997,p.154]:

> "Sphere-sovereignty does not yield a watertight compartment or mechanical division among the areas of life. It is, as we have seen, an organically most deeply cohering principle, for it begins with the religious root-unity of the life-spheres."

One of the very few diagrams that Dooyeweerd devised, reproduced in Fig. 3.1.4.1, indicates how he conceived of the relation between

aspects. It shows a kernel with a constellation of meaning, half of which anticipates later aspects and half of which retrocipates earlier ones. Dooyeweerd called these directions the anticipatory (or 'transcendental' [Dooyeweerd, 1984,III,p.109]), and the foundational or substratum.

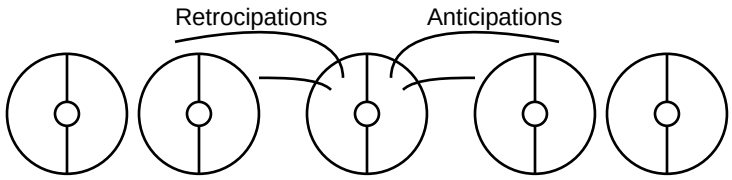

Figure 3.1.4.1. Spheres of meaning

The lingual aspect, for example anticipates the social (in that it would be largely meaningless without social intercourse, restricted to private note-taking) and retrocipates the analytic (in that all symbolic signification involves concepts) and the formative (in that it involves their structuring). To speak of 'later' and 'earlier' aspects presupposes a linear order among them, which Dooyeweerd called cosmic time (Dooyeweerd's theory of Time is not discussed here). Immanence philosophy has never posed the problem of this order [II,p.49] (though some systems theory has now perhaps begun to do so). The quantitative and pistic aspects, as terminal aspects, are special [Dooyeweerd, 1984,II,p.52-54]. Anticipation and retrocipation will be important in computer system architectures, discussed in chapter 7, and in understanding technological progress, discussed in chapter 8. There are three main types of inter-aspect relation: dependency, analogy and what we will call 'reaching out', which have both anticipatory and retrocipatory directions.

3.1.4.6 Inter-aspect dependency

Each aspect depends on earlier aspects for its facilitation and on later aspects for the opening of its full meaning [Dooyeweerd, 1984,III,p.91], such as exemplified above by lingual aspect's retrocipation of the formative and anticipation of the social. (Dooyeweerd's notion is not unlike Hartmann's notion of lower strata 'bearing' higher, but places more emphasis on anticipation than Hartmann did.) Foundational dependency (a more common term for retrocipatory dependency) is important in IS because it is concerned with implementation, and helps us understand the levelled nature of computers and information (chapter 5), where it is explained more fully. Anticipatory dependency in the field of IS as concerned with application, and hence is important when anticipating usage in information systems design (chapter 6). Anticipatory dependency is open-ended and so is relevant when considering building future-proof computer system architectures (discussed in chapter 7). In Dooyeweerd dependency does not imply reducibility, which means that our frameworks for understanding do not need to be based on the system-theoretic notion of supervenience.

This order of aspects offers a basis for labelling groups of aspects. 'Pre-' or 'post-' meaning the aspects before or after an

aspect. Other labels that will be referred to include:

- # Social aspects: social to pistic
- # Human aspects: analytic to pistic
- # Physical aspects: physical to pistic
- # Mathematical aspects: quantitative to kinematic (pre-physical).

3.1.4.7 Inter-aspect analogy

In each aspect there are echoes of all the other. This is a major component of what Dooyeweerd called sphere universality [1984,II,p.331], which is an antidote to sphere sovereignty. For example causality is physical but there is something that resembles it in all aspects; see Geertsema's [2002] discussion of aspectual 'causality'. Dooyeweerd gave [1984,II,p.118ff.] a number of examples of analogical echoes in the analytic aspect, such as analytical space, the logical order of co-existence, which is analogical retrocipation, and logical form, an analogical anticipation of the formative aspect. While dependency has a certain necessity about it, inter-aspect analogy does not. For example the 'movement' from premise to conclusion works well without any kinematic movement, while physical processes, which depend on the kinematic, do not. Inter-aspect analogy is not to be confused with concrete analogies that we detect or create between things, such as metaphors; it enables these. Inter-aspect analogy is important in computer system architectures and is thus explained in chapter 7.

3.1.4.8 Inter-aspect 'reaching out'

There seems to be a third inter-aspect relationship, which Dooyeweerd did not much discuss, but which must be differentiated from both dependency and analogy, where each aspect 'reaches out' to the meaning of all the others. Fig. 3.1.4.2 shows two of these. The analytic aspect reaches out, in that we make all kinds of distinction: between amounts, shapes, feelings, etc. and the lingual reaches out in that it enables us to speak or write meaning of all kinds. Reaching-out is clearly differentiated from dependency and analogy by the following example of lingual-aesthetic relations:

- # Dependency (anticipatory): Verse is a form of lingual structure and use that is particularly meaningful in the aesthetic aspect, but which would be a mere speculative curiosity without reference to the lingual aspect.
- # Analogy: The lingual notion phrase or sentence is used analogically to refer to a short section of music.
- # Aspectual reaching-out (to signify): Words like 'harmony', 'beauty', 'music', 'art' signify aesthetic meaning.

Whereas the two directions of inter-aspect dependency differ markedly, aspectual 'reaching-out' or 'role' feels the same whether directed towards earlier or later aspects. Lingual 'reaching out' will prove especially important in understanding information systems.

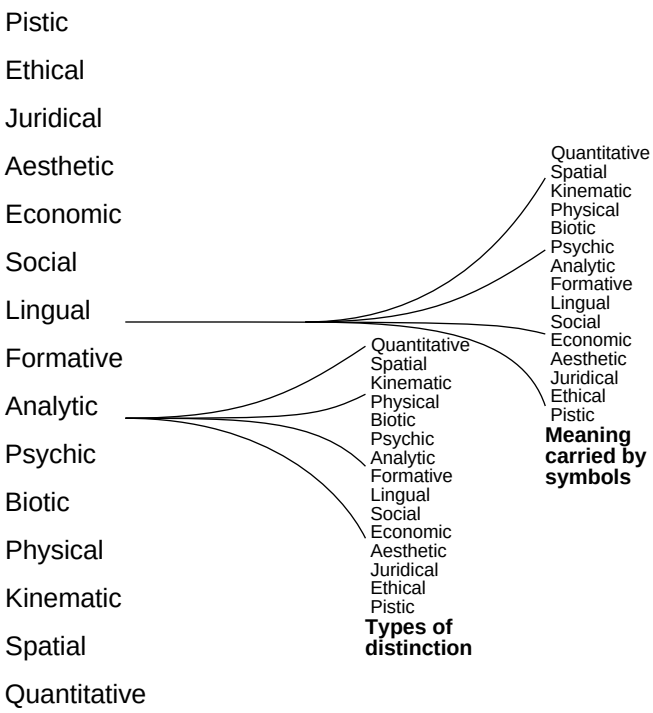

Figure 3.1.4.2. Aspectual reaching-out

3.1.4.9 Aspectual normativity

Earlier aspects are determinative while later aspects are normative. The earlier aspects (especially quantitative to physical) are determinative while the later aspects (especially from the analytic aspect onwards) are normative, allowing freedom. For example, we have freedom to go against the lingual law that it is better to abide by the syntax of the language we are using, but seven people in a room do not have the freedom to be four (a law of the quantitative aspect). Some hold that normativity begins with the analytic aspect, while others, such as de Raadt [1991], who employs them in business analysis, suggest a gradual increase in normativity along the aspects. Though Dooyeweerd did not develop it clearly, there seems to be a difference between normativity and freedom (non-determinativity). Freedom means that the future is open (not determined, e.g. we can choose different syntactic structures), while normativity distinguishes what is 'right' or beneficial from what is 'wrong' or detrimental (e.g. refusing to abide by syntax altogether). (Note: though we have freedom to go against laws of normative aspects, we are never free from repercussions of so doing, because of pertinence.) That determinativity, freedom and normativity are brought together in such a way frees Dooyeweerdian thought from the dialectics of the NFGM presupposition and especially that observed in IS in the relationship between positivism, interpretivism and criticalism. Aspectual normativity and non-determinativity will be found useful in considering IS success (chapter 4), the difference between humans and computers (chapter 5) and 'The Struggle between Guidelines and Funkiness' (the title of a stream at HCI International Conference in 2003) in ISD (chapter 6).

3.1.4.10 Grasped by intuition

Aspectual meaning is grasped by the intuition, but not by theoretical thought. For example, we know what justice is but find it impossible to define, because thinking about it relies on abstracting it from properties of things we encounter. Since, kernel meanings may be grasped by intuition, categories based on aspects tend to be easy to understand, and they inform rather than mislead in aspectual analysis used in chapters 4 to 8. Intuition is not, however, absolute and is subject to cultural, experiential and religious modification [Dooyeweerd, 1984,III,p.29], but can still help us in intersubjectivity, and even trans-cultural understanding such as is necessary to the Internet.

3.1.5 Philosophical Roles of the Aspects

Aspects, as spheres of meaning and law, enable the cosmos to be and occur; they are a transcendental condition for it. In the context of formulating frameworks for understanding IS, the following philosophical roles which aspects fulfil are important, though Dooyeweerd himself never set these out as systematically as is done here.

- **Distinct categories of meaning**. As spheres of meaning, aspects provide distinct ways in which things can be meaningful, especially to us who attribute meaning. This enables us, for example, to see a web site as meaningful from the point of view of the economic aspect (e.g. how much money it makes), the juridical aspect (will anyone sue it?), the aesthetic aspect (its artistic merit), and to discuss it in such terms. As spheres of meaning, aspects provide a basis for intersubjectivity. Though Dooyeweerd [1984,II,p.50] stressed that aspects are not the same as Kant's cetegories of thought, aspects may be seen as a foundation for them. This validates diverse ways of understanding a thing, such as a computer (chapter 5) and will be found helpful in accounting for the perspectives that people can take of things (chapter 6, chapter 8).

- **Distinct rationalities**. As a sphere of meaning, each aspect provides a different way in which we exclaim "That makes sense!" or "That does not make sense!" Winch [1958] conveyed a similar idea: "in science, for example, it would be illogical to refuse to be bound by the results of a properly carried out experiment; in religion it would be illogical to suppose that one could pit one's strength against God's." Mathematical rationality is different from physical, from juridical, and so on. The radical irreducibility of aspects means that we can never reason our way from (concepts of) one aspect to (those of) another by logic alone. The notion of distinct rationalities is important in understanding conflicts (chapter 6) and in researching inference mechanisms chapter 7.

Distinct modes of being. Each aspect provides a distinct way in which a thing can exist. Praxiteles' sculpture of Hermes and Dionysus is both a block of marble (physical aspect) and a work of art (aesthetic) [Dooyeweerd, 1984,III,p.110-127]. Likewise, a computer might have at least six modes of Being, defined by physical to lingual aspects (chapter 5). Dooyeweerd held that Being cannot be understood any other way, especially if we approach it with an everyday attitude. It is in this way that cosmic meaning is prior to, and a transcendental condition for, being. Dooyeweerd's theory of things is expounded below.

Distinct ways of functioning. As sphere of law, each aspect enables concrete entities to concretely function (occur, happen, behave):

Subject-side responds to Law-side --> Occurrence.

For example, as I write this, I function in the lingual aspect of signifying, in the formative aspect of structuring, in the analytic aspect of conceptualizing, in the psychic aspect of sensory-motor activity, etc. Such functionings are not to be seen as parts of a whole nor as forming a temporal sequence, but to be seen as different ways in which the whole experience of writing is meaningful. That aspects enable diverse ways of functioning is useful in understanding use of computers (chapter 4) and ISD (chapter 6). (In the normative aspects, we may be aware of responding to aspectual law, but in determinative aspects, 'respond' takes on an unusual meaning, and we experience it more like something happening to us, for example the physical law of gravity, or having a property or attribute, such as being 6 feet tall (spatial aspect).) Things may function in each aspect as either subject or object, and this non-Cartesian notion of the subject-object relation (see chapter 2 'Escaping Descartes and Kant') offers a subtle dignity to things, in that subject does not necessarily imply human (e.g. a plant functions as subject in the biotic aspect) and because objects are not to be seen as passively acted-upon.
Several things arise from aspectual functioning, including:

- distinct basic kinds of property (e.g. physical mass, aesthetic rhythmic scheme);
- distinct ways of relating (e.g. physical causality, social friendliness, ethical love);
- different kinds of possibility (e.g. that the plant will thrive (biotic), that we will achieve our plans (formative)).

These will be useful when designing technologies (chapter 7).

Distinct types of repercussion. Because aspectual law has the characteristic of promise there are inevitable repercussions to each type of functioning, a different type for

each aspect. Some are exemplified in Table 3.1.5.3, which may be referred to later when repercussions are discussed in chapter 4. Aspectual repercussion may be seen as an analogical echo of causality. To some extent, the time-response of repercussion lengthens with the aspects, from almost immediate in the earliest aspects to centuries in the pistic aspect (cf. Lonergan's [1992] 'longer cycles', of decline or creation and healing) though these must be expected to vary in each case. Aspectual law pertains (§3.1.4) -- and repercussions occur -- whether we are aware of it or not. Chapter 4 shows how this provides an understanding of the complex impacts that IS usage has.

Table 3.3.9. Aspectual repercussions

Aspect	Example Repercussion	Typical Time
Physical	Electric conductance	Pico-seconds
Biotic	Hormone release	Sub-seconds
Sensitive	Reflex response; nerve activity	Sub-seconds
Analytical	Switch attention	Second
Formative	Making a choice, given the info	10 seconds
Lingual	Write, utter or understand message	Minutes
Social	Initiate friendship or respect	Hours
Economic	Effect the saving of a resource	Week
Aesthetic	Make a thing fashionable	Months
Juridical	Bring to justice	Years
Ethical	Build attitude of forgiveness (S.A.)	Decades
Pistic	'Longer cycles'; see text	Centuries

Distinct kinds of normativity. In general, beneficial or positive repercussions come from functioning in line with the laws of aspects and detrimental or negative repercussions come from going against the laws of aspects. Each aspect yields a distinct type of Good and Evil, such as:

- # Biotic aspect: vitality, health vs. disease, threat to life
- # Sensitive aspect: sensitivity vs sensory overload or deprivation
- # Analytical aspect: clarity vs. confusion, illogicality
- # Formative aspect: forming, creating, achieving vs. destroying
- # Lingual aspect: conveying truth, understanding vs. deceit and misunderstanding
- # Social aspect: friendship, stability vs. enmity, refusal to relate
- # Economic aspect: care, frugality vs. waste, squandering resources

- # Aesthetic aspect: harmony, fun vs. disharmony
- # Juridical aspect: justice, giving due vs. injustice, denial of what is due
- # Ethical aspect: generosity, giving, sacrifice, hospitality vs. selfishness, taking advantage of others, competition
- # Pistic aspect: loyalty, trust, orientation to true God vs. disloyalty, cowardice, idolatry.

This view of normativity is useful in understanding success and failure in IS use (chapter 4), in formulating guidelines for ISD (chapter 6), in defining constraints (chapter 7) and in understanding impacts on society (chapter 8).

- # **Distinct ways of knowing**. Each aspect provides a distinct way of knowing: theoretical, social and cognitive knowing, for example, are all different. Full knowing, which is everyday experience, involves every aspectual way of knowing in harmony with each other. See more on knowing below.

3.1.6 How Aspects May be Delineated

A suite of aspects is one of the primary tools that will be used in formulating frameworks for understanding IS. Dooyeweerd's suite will be used here, but some readers might wish to modify it, use another, or even create their own. What guidance can be given?

First, while suites of aspects are offered, no suite is 'given' in the sense of a claim to absolute truth being forced upon us. Dooyeweerd was clear [1984,II,p.556]:

> "In fact the system of the law-spheres designed by us can never lay claim to material completion. A more penetrating examination may at any time bring new modal aspects of reality to the light not yet perceived before. And the discovery of new law-spheres will always require a revision and further development of our modal analyses. Theoretical thought has never finished its task. Any one who thinks he has devised a philosophical system that can be adopted unchanged by all later generations, shows his absolute lack of insight into the dependence of all theoretical thought on historical development."

This is because the very activity of delineating and characterising aspects, compose a coherent suite, and then express it is words relies on subject-functioning in the analytic, formative and lingual aspects at least, and all are non-absolute.

Nevertheless, a suite is 'taken' by us, when we adopt it for purposes of differentiating categories or any other task -- even if in the next breath we question it.

Second, delineation of aspects is not invention but discovery. While our beliefs about, knowledge of, and expression of, aspects, and the construction of suites, may be socially constructed, their pertinence is not. Indeed, they are what enables social construction.

However, this is not a scientific but a philosophical form of discovery, so requires a different method, one that enables us to take

a lifeworld rather than theoretical attitude towards the diversity of our experience. (The difference between science and philosophy is discussed later.)

From these two principles, one can offer the following practical guidelines:

- # Be sensitive to our intuition of kernel meanings, reflecting on life experience, ones own and that recorded or written by others, especially those of distant cultures. Poetry is good.
- # But always recognise that intuition is culturally shaped, especially to ignore certain aspects, and discourse is strongly influenced by prevailing world-views and ground-motives.
- # This can yield an initial suite, for more precise consideration.

- # Tentatively take account of what the sciences have so far discovered about their aspect (see 'science' below).
- # The method of antinomy [Dooyeweerd, 1984,II,pp.37-41]. Conflation of aspects can be detected by examining paradoxes; Dooyeweerd's examination of Xeno's Paradox (race in which hare can never overtake tortoise) led him to the conclusion that the kinematic aspect cannot be reduced to the spatial.

Most thinkers have been informed by only some of these. Dooyeweerd has been informed by all. This, coupled with his philosophical examination of the characteristics and roles of aspects, suggests that Dooyeweerd's suite is at least of comparable quality with the others, and thus we may place some trust in it. Thus it will be 'taken' as the suite to inform our formulation of frameworks for understanding throughout this work.

3.2 THINGS

As already mentioned above, Dooyeweerd believed that all temporal Being is founded in meaning. His theory of things presupposes his theory of modal aspects. This section examines some of Dooyeweerd's approach to thing and thingness.

It covers all kinds of things, all that we experience in the subject side of reality, whether these be past, present or future, entities or events or processes. material or abstract or conceptual or social, natural or artificial or manufactured. He believed that a theory of thingness should be able to account for all kinds that we might experience with the everyday attitude. He rejected naïve realism, which he held to be a theory about what constitutes thingness, namely that a thing is nothing more than as we directly experience it.

Though he sketched out how the being of things relates to aspectual meaning in volume II of [1984], it was in III, 'The Structures of Individuality of Temporal Reality', that he most fully developed his ideas. Dooyeweerd was particularly interested in typology and in social institutions like the state.

3.2.1 Everyday Experience of Things

Dooyeweerd's theory of things was motivated by deep problems at the root of our conventional, theoretical view of things. As was seen in §2.4.3, most of Western thinking has presupposed Being (or Process) rather than Meaning. The current ground-motive, NFGM, drives apart everyday experience. The Nature pole dictates that Being is purely deterministic (which possibility was explored by pre-Kantian thought), which is untenable because our human experience of freedom is denied. The Freedom pole dictates that Being must be free but, as made explicit in Kant's conclusion that there must be an unbridgeable gulf between thing and thought, so that we cannot know the Ding an sich (thing in itself). This too is untenable in the light of everyday experience that we can know things (even though it is almost universally uncritically accepted by post-Kantian versions of idealism that have entered the field of information systems as interpretivism, anti-essentialism, criticalism).

Dooyeweerd argued that the Kantian gulf is a theoretical abstraction which is rejected by everyday experience and, if accepted, distorts it. We engage with things, and they engage with us. This is a conundrum that phenomenology and existentialism tried to tackle. But they, taking the immanence-standpoint (see chapter 2), could not inquire into the nature of thingness. Dooyeweerd concluded [1984,III,p.53], having made a comprehensive survey of 2,500 years of Western thinking,

> "As far as I know, immanence philosophy, including phenomenology, has never analysed the structure of a thing as given in naïve experience."

This causes immense problems in attempts to understand IS, especially in trying to understand the nature of computers and information (chapter 5).

3.2.2 Some Problems with Extant Approaches

Some of the problems inherent in extant presuppositions of thingness have been encountered and recognised with IS research. For example, from its earliest days in the 1970s, the knowledge representation community has had to come to terms with the diversity encountered in everyday life (especially via 'natural language' utterances), and Hirst [1991] reviewed a number of problems that arise from 'existence assumptions in knowledge representation'.

The first type of problem Hirst discussed is the distinction between different types of existence, such as between concrete (physical) and abstract (non-physical) existence (he cited the number 27), and to this might be added the mind, beliefs held, messages sent, symphonies, and the like. He gave it little consideration because Quine and others had dealt with it. Hirst discussed the problems thrown up by Kant's proposal that existence cannot be treated as a predicate like colour or height, including when trying to treat existence itself as an object (as in "The existence of Pluto was predicted by mathematics and confirmed by observation").

But what occupied most of Hirst's discussion was "to account for the fact that in ordinary, everyday language we can talk about certain things without believing that they exist." A particular question was how logical inference, which lies at the root of knowledge representation, could cope with non-existent things -- such as voids ("There are too many holes in this cheese", "A complete lack of money led to the downfall of the company"), things that aren't there ("There's no one in the bathroom"), events that don't occur, actions that are not taken ("The (threatened) strike was averted by last-minute negotiations"), fictional or imaginary objects ("Dragons like baklava", "Sherlock Holmes lived in London") and unreal things ("Round squares make me seasick -- especially the green ones"). His solution was to suggest that, despite Kant, existence should be treated as a predicate -- which departs from the Being presupposition.

Yet another set of problems that Hirst discussed briefly is concerned with change, including existence at other times ("Alan Turing was a brilliant mathematician") and continued existence of some kind ("Alan Turing is a celebrated mathematician", "Alan Turing is dead").

A further problem is that it is easy to misunderstand the part-whole relation, and thereby make the category error of assigning agency to the part rather than the whole, such as that the brain rather than the person understands [Boden, 1990].

All these serve to show that the notion of Being is problematic and thus that philosophy should not just account for types of things, as the ancient Greeks tried to, but inquire into the nature of Being as such. Heidegger tried to but, as already mentioned, never completed his quest.

3.2.3 Dooyeweerd's Approach

Dooyeweerd, rejecting the immanence-standpoint, presupposed Creation, Fall and Redemption as a ground-motive (§2.3.1.2), and thus presupposed that cosmic Meaning and Law are more fundamental than Being (§2.4.3). As has already been quoted:

> "Meaning is the being of all that has been created ..." [Dooyeweerd, 1984,I,p.4, his italics]

It is not sufficient to say that things 'have' meaning; cosmic meaning is the very nature of Existence itself. Meaning is the first thing we should say about anything, before talking about its existence. Though this might seem a radical departure in some areas of research, it is not so unusual in others. For example, Smircich [1983,p.353] suggested that the important task of researchers of organizational culture is not to ask, "What is organizational culture?", so much as "How is organization accomplished, and what does it mean to be organized?"

As will be seen in chapter 5, many have tried to understand -- and debate -- the nature of computers by presupposing some self-dependent 'substance' that is the essence of computer (e.g. Searle's contention that the computer works by physical causality while

humans work by biological). But, of things in our everyday experience, Dooyeweerd said [1984,III,p.108],

> "For it is really impossible to ascribe their typical nature to an independent 'substance'. Their very nature is meaning, realized in a structural subject-object relation. A bird's nest is not a 'thing in itself', which has a specific meaning in the bird's life. It has as such no existence apart from this meaning."

To say something exists is to say it means, and to say this we must refer to at least one of the spheres of meaning. Things are because they mean. A poem exists qua poem only because of the aesthetic sphere of cosmic meaning. Without (that is, without reference to) aesthetic meaning, it does not exist as a poem. Likewise, it exists as a piece of writing by virtue of the lingual sphere of cosmic meaning. Likewise, rocks are rocks by virtue of the physical aspect. Plants are because they mean (biotically). The following 'exist', as the things named, by virtue of their meaning in the stated aspects (among others):

the sculpture: aesthetic and physical
the poem: aesthetic and lingual
the bunch of keys: physical and juridical
the landslide: physical and spatial
the bird's nest: physical, biotic and sensitive
the kennel: physical, biotic, sensitive and formative
the greyhound racing track: spatial, kinematic and aesthetic
the skeleton in a museum: biotic, physical and formative (historical)
the ring: social and physical
the kiss: ethical and social
the speed limit: juridical and kinematic.

We can also treat events or processes as things:

The race: kinematic, social, aesthetic
The act of programming: lingual, formative
The war: juridical, social, formative, pistic.

Chapter 5 will develop this to understand the nature of computers:

The computer (running software): physical, psychic, analytic, formative, lingual (and other aspects)
The mouse pointers: sensitive, analytically.

Thus things do not exist without the spheres of law-and-meaning. Their very being is enabled by, and constituted in them. Their coming into being is only by aspectual functioning (poem by aesthetic and other functioning, pebble by physical, etc.) and their being is maintained by continued aspectual functioning. This is so for both physical or natural things and for abstract, conceptual and social things. In an ingenious way, Dooyeweerd brought together an account of both physical, conceptual and social things into a single framework, while providing a basis for differentiating them.

3.2.4 Becoming and Change

Dooyeweerd began Volume III with the question of how do we account for changes in a thing, through some of which it is the same thing, while others destroy it as that thing. The book with pages torn or scribbled on is still the same book, but throw it in the fire, so that it burns up, and it ceases to be the same thing. In a short section headed 'Reality as a continuous process of realization' Dooyeweerd said [Dooyeweerd, 1984,III,p.109], poetically:

> "For the reality of a thing is indeed dynamic; it is a continuous realization in the transcendental temporal {i.e. anticipatory aspectual} direction. The inner restlessness of meaning, as the mode of being of created reality, reveals itself in the whole temporal world. To seek a fixed point in the latter is to seek it in a 'fata morgana', a mirage, a supposed thing-reality, lacking meaning as the mode of being which ever points beyond and above itself. There is indeed nothing in temporal reality in which our heart can rest, because this reality does not rest in itself."

Platonic ideal types cannot help because they presuppose all change is a departure from the ideal. Neither are either of Aristotle's substance concepts sufficient to answer that question, especially if we respect everyday experience [Dooyeweerd, 1984,III,p.7-14]. Nor is an answer based on sensory experiences [III,pp.18-22]. Nor is an answer based on naïve realism [III,pp.22-24]. Dooyeweerd sought a notion of being and change that accords with everyday experience and in which there is no implication that change is evil.

His proposal was that things come into being, exist, change, and cease to be, by aspectual functioning -- whether subject- or object-functioning. Perhaps the proverbial hammer, that has had two new heads and five new handles -- is it the same hammer? -- can be understood in this way. From the physical aspect it is a different thing. But from the formative aspect (its meaning as a tool) and the juridical aspect (my ownership of it), it remains the same thing. Likewise, this book is still the same book as when it began with a different structure, argument and even message several years ago, and despite being a different set of computer files etc.

Dooyeweerd's meaning-based approach is thus nuanced enough to allow us to see a thing as both same and different without contradiction. Pacé Plato, it is not change itself that is either good or evil, so much as the normativity of this functioning that determines whether, and in what way, change is either good or evil.

3.2.5 Types of Things

The question of whether a thing remains that same thing presupposes a notion of type. In discussing the duration of a thing [1984,III,p.76-9], Dooyeweerd concluded that

> "In general we can establish that the factual temporal duration of a thing as an individual and identical whole is dependent on the preservation of its structure of individuality."

'Structure of individuality' refers to the entity's response to the

'internal structural principle' of the thing, which defines its type as that thing. The internal structural principle is a law which governs how a thing of a given type responds to the various aspects; it is what was called a type law in chapter §2.4.4.

Dooyeweerd identified three levels of type: radical types, geno- or primary types, and pheno- or variability types [Dooyeweerd, 1984,III,p.93]. Radical types are the first division, differentiated by the aspect that is most important in defining the main meaning or destination of the thing, which is known as the qualifying aspect; Table 3.2.3 illustrates the notion of radical types.

Table 3.2.3. Types of thing by qualifying aspect

Aspect	Example things
Quant'tive	Amount, proportion
Spatial	Shape, Distance, Angle, Direction
Kinematic	Path or route, Flow
Physical	Energy, Waves, Particles, Material, Fields, Forces, Rock
Biotic	Organism, Organ, Tissue, Cell, Plant
Sensitive	Sound, Colour, Feeling, Emotion, Excitation, Animal
Analytical	Concept, Distinction, Deduction, Awareness
Formative	Goal, Achievement, Forming, Will, Tool, Skill
Lingual	Word or sentence, Book, Writing, Utterance, Diagram, Index
Social	Friendship, Institution, Status, Respect
Economic	Resource, Limit, Production+consumption, Money, Management
Aesthetic	Music, Sculpture, Quisine, Humour, Fun, Sport, Nuance
Juridical	Responsibility+rights, Reward+punishment, Laws
Ethical	Self-giving love, Generosity, Sacrifice
Pistic	Faith, Trust, Loyalty, Worship, Commitment, Ritual

It is the qualifying aspect that determines the unity of a thing as of that type of thing. All its other aspects serve the qualifying. For example, the qualifying aspect of a book is the lingual, and the formative aspect of its structure, and the psychic aspect of the marks on its page, serve the lingual function of being-read. This accounts for the unity of the thing as that type of thing. Dooyeweerd did acknowledge that the qualifying aspect of a thing might change; an antique shawl might become a wall hanging [III,p.146]. The notion of qualifying aspect is discussed more in chapter 4, where it helps differentiate types of human activity, and chapter 5 where it is seen how all aspects of a computer serve its lingual qualification.

Geno-types are usually defined by a second reference to aspects; for example while all social institutions are qualified by the social

aspect, a business, church, state are led by the economic, pistic and juridical aspects respectively. Pheno-types are subtypes that arise from interaction with other things of a different geno-type.

Dooyeweerd explored typology among natural things, and also in social institutions, but not much of other types of thing (an exercise he left to us). He made reference to some things that cannot be fully understood in such ways, including semi-manufactured products, which are explained in chapter 7, and Umwelten, explained in chapter 8.

Any superficial resemblance between Dooyeweerd's notion of type laws and Plato's notion of ideal types dissolves when the inherent dynamicity of the former is acknowledged, which allow enormous latitude of variability without any hint of departure from perfection. Dooyeweerd dealt with the tension between individuality and universality, not by positing a realm of ideal perfect types, which denigrates individuals, nor by denying universality as philosophical nominalism does, but by placing universality within the law side and individuality in the subject side. A true universal can never arise purely from study of the subject side. (Strauss [2000,p.21,footnote 2], who disliked nominalism, criticises Dooyeweerd for being too nominalistic.)

3.2.6 Relationships

"In veritable naïve experience," said Dooyeweerd [1984,III,p.54], "things are not experienced as completely separate entities." In this, Dooyeweerd was signalling his agreement with existentialism that we can never understand a thing without reference to its context, but he offered a fresh approach and new conceptual tools for understanding relationships a thing has with this context.

First, Dooyeweerd differentiated two contexts, law and entity side, while existentialism largely conflates them. Law-side relationships take the form of law-subject relations, in which the subject responds to law-and-meaning that enables. Entity-side relationships are of several types, some functional and some structural.

3.2.6.1 Functional Relations

Functional relationships that Dooyeweerd discussed include the subject-object, subject-subject and Gegenstand relations. All functional relations are enabled by agents functioning in the aspects, subject to aspectual law. As has already been mentioned, Dooyeweerd's subject-object relation is conceived very differently from the conventional, Cartesian one.

What is perhaps even more interesting is that his notion of law spheres gives grounds for understanding subject-subject relations, where both entities interact because both function in the same aspect. Buber's I-Thou relationship is a subject-subject relationship in the social, and also ethical, aspect. If I understand Dooyeweerd aright, then it is in subject-subject relationships that genuine interaction

between entities occurs. For example, for communication to take place, both speaker and hearer must function as subjects in the lingual aspect. Subject-subject and subject-object relations are useful in considering human-computer interaction in chapter 4 and the nature of computers in chapter 5.

Gegenstand relations are similar to subject-object relations but, while a subject-object relation involves intimate engagement between subject and object, the Gegenstand relation involves distance between them because it is not the object as such with which the subject relates but an abstracted aspect of the object. The most common Gegenstand Dooyeweerd discussed was that of the analytic aspect (see below), but he hinted [1984,II,p.275] that there are Gegenstand relations involving other aspects. This will be useful in understanding distal HCI in chapter 4.

3.2.6.2 Structural Relations

A structural relationship is one that contributes to the Being of a thing as that thing. There is a degree of necessity in structural relationships that is absent from functional relationships. The best-known structural relationship is the part-whole relation (or system-subsystem), but Dooyeweerd gave it a new twist, because he viewed it from the point of view of cosmic meaning rather than from one of structure (Being) alone.

Things function as wholes, not as parts. It is not the brain that thinks or feels but the person. The brain only functions in aspects in which it can meaningfully be seen to be a whole in its own right, such as the physical. The psychic aspect is not one of these, so the brain cannot feel. This is discussed more fully in chapter 5.

In Praxiteles' sculpture, Hermes and Dionysus [Dooyeweerd, 1984,III,p.110], a part-whole relationship exists between the torso, head, limbs etc. and the body, and between eyes and head, but it does not seem right to say that calcium carbonate molecules of which the marble is composed are parts of the torso of Hermes, nor that the limbs are part of the piece of marble. Likewise, while the computer, motherboard and memory chips and components form a true part-whole hierarchy, and so do data structures, modules and program, we cannot say that data structures are part of the motherboard.

Why not? Dooyeweerd accounts for this intuition by defining parts as having the same qualifying aspect as their whole. The part has no meaning as a part without reference to the whole [Clouser, 2005:287]. For example, my pancreas is meaningless if separated from me, even though its physical functioning can be made to continue in a laboratory. Aggregation of parts into larger parts and eventually a whole only takes place within an aspect. This will be important in separating out bits and bytes from characters and words.

There is an assumption in much science that the functioning of the whole emerges from, and may be understood on the basis of, the functioning of the parts. Dooyeweerd turned this on its head: we can only fully understand the (functioning and meaning of) the part once

we understand the (functioning and meaning of) the whole. For example, it is not the functioning of the 'neural apparatus' that determines our perceiving, but rather our perceptual functioning that determines the activity of our neural apparatus. It is not my lungs that breath, but I who breathe.

What, then, is the relationship between the block of marble and the torso, head, eyes, etc.? Dooyeweerd borrowed the word 'enkapsis' from biology for these, and extended its meaning. In an enkaptic relationship, two wholes are joined in a structural relationship in which both are necessary. He identified five types of enkapsis:

- Foundational enkapsis is that which occurs between meaningful wholes and their aspectual beings, such as the sculpture and the block of marble from which it is made. This type of relation is useful in understanding the nature of computers in chapter 5.
- Subject-object enkapsis is exhibited by a hermit crab and its shell.
- Symbiotic enkapsis is exhibited by clover and its nitrogen-fixing bacteria.
- Correlative enkapsis is the relationship that exists between an Umwelt (environment, such as a forest) and its denizens. It is useful in understanding our technological ecology (chapter 8).
- Territorial enkapsis is the relationship between, for example, a city and its university, orchestra or football team.

It may be that there are other types of enkaptic relationship that Dooyeweerd did not conceive of, especially to be found in information systems.

Enkapsis is an insight unique to Dooyeweerd, and it useful formulating frameworks for understanding in almost every area of research and practice in IS.

3.3 EXPERIENCE, KNOWLEDGE AND ASSUMPTIONS

In the light of Dooyeweerd's approach, the whole epistemological problem of knowledge, experience and assumptions had to be re-examined, including even the questions that traditional philosophies had asked about it. He wrote in the context of an age-old assumption that theoretical thought is superior to everyday experiencing as a route to knowledge, and so had first to spend considerable time showing how the problems of epistemology had been approached in the wrong way. So he had to redefine 'the epistemological problem'.

In Volume I of [Dooyeweerd, 1984] he argued, by means of immanent critique, that immanence-philosophy has always presupposed the autonomy of theoretical thought. Part II of Volume II, entitled 'The Epistemological Problem in the Light of the Cosmonomic Idea' presents a transcendental critique of what makes a theoretical attitude of thought possible, which is briefly outlined below and how it relates to intuition and truth. But the problem of

knowing may also be approached via Dooyeweerd's positive philosophy, as a type of aspectual functioning.

This section considers the status of the knower among what they know, intuition, theoretical thinking (including science and philosophy) and presuppositions.

3.3.1 The Knower-Known Relationship

Geertsema [2000,p.96] suggests that one of the major contributions of Dooyeweerd's approach to knowledge and theory has been to put the human knower at the centre:

> "A long tradition in Western philosophy suggests that the subject of philosophy and science is or should be human reason alone. In our century this view has led to a strong emphasis on method. ... Over against this tradition Dooyeweerd emphasized that it is the human person who thinks, does scientific work, and theorizes."

Dooyeweerd stressed that the knower is part of what is known, rather than a detached observer. He rejected Descartes' driving apart of the thinking subject from the thought-about object, and Kant's driving apart of phenomenon from noumenon, and provided a sound basis on which they could be reunited. The driving apart, he argued, was an inevitable consequence of presupposing a dialectic between nature and freedom (NFGM, which he rejected), especially because of the presupposition of an autonomous human selfhood. He did not seek to mend the Cartesian split; rather, he held the split to be falsehood from the very start. Geertsema [2000,p.101] said, of Dooyeweerd's view,

> "Knowledge and understanding do not start with the subject as if knowledge has to bridge an original gulf between the two. ... To do so we have to ignore that in actual life we experience ourselves in coherence with the world around us. There is no original gap that needs to be bridged. Knowledge presupposes that we are in a relationship already."

Dooyeweerd's view is akin to Polanyi's [1967] that all knowledge is 'dwelling'.

To know (or experience, think, reflect) is to function as subject in the various aspects of knowing (§2.4.4), and to be known is to function as object in those same aspects. Table 3.3.1 gives examples of various aspects of knowing or, as we might say, different ways of knowing; these will be referred to in chapters 6 and 8. For example, the psychic aspect or way of knowing enables cognitive memory, the analytic enables concepts, critical distance and doubt, the formative, skill, and the pistic, certitude (it is sometimes called the certitudinal aspect).

It should be noted that we are not, here, talking about the diversity of what we can know about but about knowing itself. The first three aspects are missing because knowing implies irreversibility, which enters the meaning-scheme only with the physical aspect. Some ways of knowing are what we often call experiencing.

Table 3.3.1. Aspects or ways of knowing

Aspect	Ways / aspects of knowing
Physical	Physical knowing is persistent change of physical state resulting from some functioning in the physical aspect. This is the physical 'implementation' of all other types of knowing (e.g. computer memory chips have a persistent electric charge).
Biotic / Organic	The way things have grown, etc. e.g. plant bent towards light 'knows' where the light is. Also the growth of nerve connections.
Psychic / Sensitive	a) Memory. Receiving stimuli and holding a memory of them in the nervous system. b) Recognition of a pattern (seen or heard) c) Instinct (of the animal kind).
Analytic	a) Making distinctions between things. b) Conceptualizing. c) Making inferences from those distinctions; reflection; what is deducible from what I already know. d) Theorizing.
Formative	a) Knowledge of structure; 'knowing my way around'. b) Skills: knowing how to achieve things.
Lingual	a) Discourse, debate that sharpens and disseminates. b) Stuff set down in symbolic form, e.g. 'knowledge' stored in books, libraries, records, archives, web sites.
Social	a) Buber's 'I-Thou' encounter, but see Ethical aspect. b) Networks of knowledge. c) Shared cultural knowledge, assumptions.
Economic	Managing limits on knowledge (personal and communal memories, etc.). assumptions.
Aesthetic	Harmonizing what we know with what else is known, and with what we experience in life. That what we know 'fits comfortably'. That insight. Example: Habermas' triples all harmonize. How an artist helps us understand reality. and communal memories, etc.).
Juridical	Giving due weight to various pieces of knowledge and to the whole; proportion and a sense of 'perspective', an informed sense of the essence of things.
Ethical	A complete 'entering in' to the other person, in Bergson's sense, is only possible with complete self-giving. Hebrew in Genesis 4:1 the word "he-knew" for 'have intercourse with'. Buber's I-Thou relationship contains at least an element of self-giving.
Pistic	Certainty. Committing to a belief, both the little commitments in everyday living and the large commitments for which we might lay down our lives. Also prejudice etc.

In Descartes and Kant, the knower-known relation is one of distance, based on Gegenstand (even though it is conventionally called 'subject-object'), and emphasising theoretical thought, and the known thing is 'passive'. But in Dooyeweerd, the knower-known relation is one of multi-aspectual engagement, and the known thing lets itself be known, not helpless against being-known. The long-held assumption of a gulf between noumenon and phenomenon has been questioned and the world is now seen as knowledge-friendly, tending to reveal rather than hide itself. This affords the known thing more dignity in the relationship, which can be important in knowledge elicitation (chapter 6), and it overcomes the dialectic between objectivism and relativism.

3.3.2 Objectivism and Relativism

A major debate in IS has been between objectivism and relativism or subjectivism, especially as rendered in Burrell and Morgan [1979]. Dooyeweerd was neither objectivist nor relativist, but not quite in the way Bernstein, for example, was. Bernstein [1983] begins with the need to go beyond objectivism and relativism, suggests that we need to let 'the things themselves' 'speak to us', recruits prejudgements to this task, and ends [p.231] with the speculative call to "dedicate ourselves to the practical task of furthering the type of solidarity, participation and mutual recognition that is founded in dialogical communities."

Bernstein starts by assuming a Kantian gulf between knower and known-thing, and this is why he found a gulf that needed bridging. But, as Geertsema [2000,p.101] said, of Dooyeweerd's view:

> "Knowledge and understanding do not start with the subject as if knowledge has to bridge an original gulf between the two. ... To do so we have to ignore that in actual life we experience ourselves in coherence with the world around us. There is no original gap that needs to be bridged. Knowledge presupposes that we are in a relationship already."

A full discussion of Bernstein must wait, but the following points may be made about why and how Dooyeweerd can take us 'beyond objectivism and relativism'.

- # Objectivism is rejected because of the subject-functioning in the normative aspects of knowing.
- # Our prejudgements, which Bernstein presupposes but does not critically examine, are revealed by Dooyeweerd as constituted in the knower's subject-functioning.
- # Subjectivism-relativism is rejected because of the object-functioning of the known thing, and because the thinking ego is not autonomous.
- # The 'things themselves' 'speak to us' because of their object-functioning.

Coming to know things is important in knowledge elicitation in IS development (chapter 6), so whether we presuppose an original gulf or not will deeply affect our hopes and aspirations, and consequently our strategies and methods. While Bernstein can only point speculatively in the direction of 'dialogical communities' and 'practical discourse', Dooyeweerd can provide more concrete guidance, not least in his insight that knowing is multi-aspectual human functioning in which the known-things let themselves be known (i.e. 'speak to us'). It links closely with intuition.

3.3.3 Critical Realism

There is some similarity with critical realism, which has been appealed to by Mingers [1992] and others to formulate frameworks for understanding some areas of IS. Both reject so-called naive realism while at the same time rejecting the Kantian gulf between noumenon and phenomenon and both believe the cosmos that

transcends our knowing is friendly to it.

But they differ in several ways. In [1984,III,p.44-47] Dooyeweerd discusses Riehl's critical realism, and argues they differ in the reasons they take everyday experience to be reliable (although not infallible), and that critical realism ends up making a theory about everyday experience. While critical realism accepts both ontology and epistemology, more recent versions of critical realism privilege the latter and end up with impoverished ontologies especially relating to the human and social aspects of everyday experience. Moreover, though critical realism might succeed in bridging the gulf between Thing and Thought, it fails to bridge the gulf between Is and Ought. Thus it is at best of only limited value in the formulation of frameworks for understanding IS. A full immanent critique of critical realism and comparison with Dooyeweerd must wait for another occasion.

3.3.4 Intuition and Self

Intuition is in the ascendency in IS, so it is important to understand what it is. Dooyeweerd discussed the relationship between intuitive and theoretical or analytical thinking at some length [Dooyeweerd, 1984,II,p.472-85 and elsewhere]. He commented on ideas by Kant, Husserl, Fichte, Schelling, Volkelt, Bergson, Riehl and Riemann, and also discussed the recognition given to intuition by Greek, Hindu and Scholastic thinkers. While thinkers like Bergson contrasted intuition to analytical thought, Dooyeweerd maintained that they cannot be divorced from each other, For example, when considering the insight of genius [Dooyeweerd, 1984,II,p.483]:

> "Intuition cannot be isolated from analysis. Conversely, analysis can never function without intuitive insight. This has been convincingly proved by Henri Poincaré ... to refute the idea of a 'pure analysis' in the mathematical sciences. ... This intuition of men of genius ... can provide them with a real theoretical insight only when it distinguishes and identifies logically. In case this subjective analytical function is absent, at most some animal instinct but not a theoretical intuition can be operative."

Bergson characterized intuition as 'entering into' objects and persons, identifying with them, and it is by intuition rather than scientific knowing by which we know our deepest selves and our duration. But Dooyeweerd's account is richer. Dooyeweerd can offer us three accounts of what we call intuition:

- multi-aspectual ways of knowing the subject-side,
- an intuitive grasp of law-side aspectual meaning,
- the immediate experience of self.

Intuition, as multi-aspectual knowing of subject-side things is constituted of functioning in every aspect -- a coherence of all the aspects of knowing mentioned above. Notice how it includes, for example, pistic certitude, which is necessary for making assumptions, which are so characteristic of intuition. But it also includes analytic knowing, which explains Dooyeweerd's belief cited above; the breaking away from intuition by analytic functioning is discussed below.

Intuitive grasp of aspectual meaning is very different. It refers to our inexplicable knowledge of what, for example, justice, amount and signification are (as kernel meanings of the juridical, quantitative and lingual aspects). Such grasp always exceeds any attempt to think about them analytically, such as to define them. Contrary to what many believe, this kind of intuition cannot even be reduced to feeling. It is not the engagement of the knowing-subject with known-object but the engagement of the human self with law-meaning.

Awareness of the self is different still, and Dooyeweerd would not usually call it intuition (though conventional thinking might). Dooyeweerd believed the self -- he also called it ego or (human) heart -- to be

- trans-aspectual, in being a subject that can respond to all aspects,
- supra-temporal, in that we have "eternity in our hearts",
- religious, in that we orientate ourselves towards an absolute.

(In this he was informed by generations of reflective thought on the topic which do not concern us here.) Because of the first, the human self cannot be seen through the lens of aspects and in particular it cannot be penetrated by analytical or theoretical thought (because to do so it must function as object therein, which is not possible). This means there can be no theory, definition nor even conceptualization, of the human self and that any attempt at such will always be wholly speculative rather than critical. Because of the second, we differentiate awareness of self from the intuition of aspectual meaning, because such intuition is temporal. All we can have is an immediate experience of our own selves.

Because of the third, the human self religiously orientates itself either to the True Absolute (the Divine, the Origin, God) or to some pretend, false absolute. Orientation towards a false absolute distorts all our aspectual functioning. (Does this sounds like a re-emergence of the mediaeval spirit-body or Greek soul-body dualism? Dooyeweerd argued it was not the case, but as his argument is complex and not relevant to our task, we need not rehearse it here.)

Note, however, that intuition is not infallible. Though it may be richer and more reliable than theoretical thought (below), intuition is influenced by culture, etc.

3.3.5 Analytical and Theoretical Knowing

Dooyeweerd did not react against theoretical thinking and knowledge in a romanticist or anti-rationalist manner, but acknowledged its validity and its special place in Western culture.

But even in theoretical thought the central place of the knower as a human subject is maintained. As Geertsema [2000,p.96] put it, Dooyeweerd "did not deny the importance of method ... but argued convincingly that theoretical thought cannot be accounted for without considering the ’ego’ as the hidden player on the instrument of

theoretical thought". This means that, as Geertsema [2000,p.89] put it, "the object of theoretical thought is not reality as it is given in human experience, but the result of an abstraction and therefore intentional not ontic." This reaffirms that what we reason about is not 'objective' reality but our normative conceptualizations.

As indicated above, a Dooyeweerdian understanding of this important way of knowing may be approached via his positive philosophy, as a way of knowing focused on the analytic aspect. But it can also be approached via his critical philosophy, by means of the two transcendental critiques mentioned in chapter 2. Dooyeweerd tried to understand theoretical thought in terms of the fundamental (transcendental) conditions that make it possible, which does not require prior acceptance of his positive philosophy. The main thing one must accept is the givenness of everyday experience, and a determination not to distort it by making a speculative theory about it first.

3.3.6 Levels of Abstraction

Clouser [2005] has provided a particularly clear rendering of Dooyeweerd's second way of critique, and what follows is a summary of this. Clouser sometimes interprets Dooyeweerd's ideas more narrowly, and he short-circuits some of Dooyeweerd's more tortuous arguments, but his rendering is nevertheless very useful especially in understaking IS development (chapter 6).

After a discussion of what a theory is (an attempt to explain, either a concrete situation (entity theory) or a general state of affairs (perspectival theory), on the latter of which he focuses), he draws attention to the importance of abstraction, which he defines [p.64] as "to extract or remove something (mentally) from some wider background". There are four degrees of abstraction, by which the thinker becomes aware of distinct aspects:

- Everyday thinking: We distinguish things or events but are not aware of aspects of those things separately; rather, we respond to aspectual laws tacitly in full engagement with reality. This is the multi-aspectual functioning discussed in chapter 3.

- Low-level abstraction: We abstract certain properties of things or events, such as the cost, colour or weight of a car, but these properties are still of the thing.

- High-level abstraction: We abstract the property from the thing -- colour as such, cost as such -- and this enables us to formulate laws, of some generality, about how such properties relate to each other, e.g. momentum = mass times velocity.

High-level abstraction involves the analytic Gegenstand relation, though Clouser avoids using that term. Gegenstand pulls aspects apart from each other. But since the aspects are interconnected they 'resist' being pulled apart, and this, suggested Dooyeweerd, is why

theoretical thinking is difficult.

Clouser then went on to argue that this presupposes a religious stance about what is assumed to be self-dependent.

3.3.7 Science and Philosophy

Higher abstraction of properties is necessary for science. To Dooyeweerd (and to Clouser) the role of science is to study the laws of aspects. If, for a moment, we return to Dooyeweerd's positive philosophy and recall that each aspect is a distinct sphere of meaning-and-law, then each aspect is the centre for a distinct arena of science -- such as physics, psychology, sociology -- because each science works within the horizon of meaning given by that aspect. We might also recall that universals do not inhabit the entity side but only the law side, and science concerns itself with what is universally so.

Since each aspect is a different sphere of meaning, with different ways of being, different rationalities, etc., each aspectually-centred science has its own distinct idea of what it is meaningful to research, research methods, criteria for truth, and so on. Table 5.3.3 shows various sciences corresponding to each aspect. It indicates that each requires a distinct research method: the positivist assumption that methods from physical sciences may be applied in all is untenable.

"The theoretical object of scientific thought can never be the full or integral scope of reality," explained Dooyeweerd [1999,p.93], so scientific research finds it very difficult to be interdisciplinary in the sense of embracing several aspects. It is, rather, the role of philosophy to reflect on this integral scope. It is the role of philosophy, not science, to address diversity and coherence, origin and destiny, being and norms, good and evil, the nature of science itself, the diverse nature of knowledge and truth, of the relationship between theory and practice. This is why philosophy is found useful in addressing the interdisciplinary areas of IT. Philosophy like science depends on higher abstraction, but it is not centred on individual aspects. Rather, it concerns itself with the connections between aspects, and thus requires an Archimedean Point, a viewpoint outwith the aspects from which to view them.

This, incidentally, also provides a Dooyeweerdian justification for the choice in chapter 1 of what this work takes philosophy to be about. Some other other views of what philosophy is base it on one or other of the basic sciences, such as logic or mathematics, but "The very notion that philosophy is founded upon self-sufficient basic sciences is rooted in the immanence standpoint" [Dooyeweerd, 1984,I,p.544]. He argued that most streams of philosophy failed in these points. Therefore,

> "We do not acknowledge as a true foundation of philosophy a 'phenomenology' as developed by Husserl or Scheler, nor a 'prima philosophia' as in speculative metaphysics. A 'logic of philosophy', as is found in Lask, a critique of knowledge as developed by Hume or Kant, as well as the critical ontology of Nicolai Hartmann or a symbolic logic in the sense of the Vienna School, are also unacceptable to us as the basis for all philosophical investigation, because they lack a really critical formulation. Nor do we agree

that a philosophy of values, or a philosophy of mind may furnish an adequate basis for all cultural sciences, whereas an epistemology may be the exclusive foundation of the natural sciences." [Dooyeweerd, 1984,I,p.543-44]

Table 5.3.3. Sciences centred on aspects

Aspect	**Science**	**Research methods**
Quant'ive	Arithmetic, Algebra, statistics	Deduction, theorem proof
Spatial	Geometry, Topology	Geometric proofs
Kinematic	Kinematics, Fluid dynamics	Infinitesimal calculus
Physical	Quantum physics, physics, chemistry, mechanics, materials science	Laboratory experiment, with physical reasoning
Biotic / Organic	Physiology, life sciences, biology	Greenhouse experiments, field studies, taxonomic analysis
Psychic / Sensitive	Psychology, Sensory sciences Cognitive sciences	Stimulus-response trials, Control groups
Analytic	Logic, Analysis	Logical proof, Some as for cognitive science
Formative	'Sciences of the Artificial' [Simon] History	Game playing, puzzle-solving, model building, forensics
Lingual	Linguistics, semiotics	Hermeneutics, cognitive studies, model building, theorizing
Social	Social science	Surveys, questionnaires, interviews, model building
Economic	Economics, management science	Statistics, model building, As social science
Aesthetic	Aesthetics	As social science
Juridical	Juridics, Legal science	Review of cases and histories, Reflection, legal deduction
Ethical	Ethics	?
Pistic	Theology, Some anthropology	Reference to sacred writings, hermeneutics, theorizing, anthropological studies, dogmatics

Though science and philosophy are primarily analytical processes, they are nevertheless multi-aspectual human activity (see chapter 3). Neither would progress well without, for example, recording and dissemination (lingual functioning), debate and social groups, resources (economic), the desire to do justice to the aspectual laws (juridical), and (pistic) vision, among other aspects. In particular, as discussed below, neither science nor philosophy are neutral, but both are strongly influenced by world views and religious presuppositions.

3.3.8 Paradigms, Perspectives and Presuppositions

Dooyeweerd was earlier than most in arguing that theoretical thought is never neutral, because it is human beings who take a theoretical attitude, and Clouser [2005] credits him with being the first to take

seriously self-performative coherence (see earlier). Independently of Dooyeweerd, we may assume, both Habermas and Foucault developed a similar theme, and their works on knowledge interests and genealogy of knowledge are better known. But Dooyeweerd still has something to contribute. Whereas these two were influenced by Nietzsche to assume it is power that lies at the root of non-neutrality, Dooyeweerd held that the non-neutrality is religious, governed by our fundamental view of the nature of reality, especially as exhibited in our ground-motives.

This has important consequences for what we take to be knowledge, appropriate ways to obtain it, and appropriate ways to use it. Even more importantly for those who seek to understand everyday experience and living, it has important consequences for how we live and experience things. In chapter 2 it was suggested that among four types of religious function that might lie at the root of research and practice in a community or area, one is the aspectual life-and-world-view (LWV).

LWVs were discussed at length by Dooyeweerd [1984,I,p.114-164]. He found them to be often centred on an aspect, giving examples of intellectualism, aestheticism, mysticism, etc. Such LWVs then exercise a strong guiding influence on intellectual thought of a community, because they embody the deeper assumptions, aspirations, quality criteria, etc. Frequently the editorial policy of a journal espouse one LWV or another, and this influences the discourse of the community so that certain aspects are privileged while others become ignored, exacerbating the imbalance in the discourse and research of that community.

But LWVs also hold sway in everyday social life. Each person privileges certain aspects and ignores others. It might not be absolute, but more like an aspectual profile. Fig. 3.4.5 illustrates some feasible aspectual profiles of various LWVs expressed by the given statements.

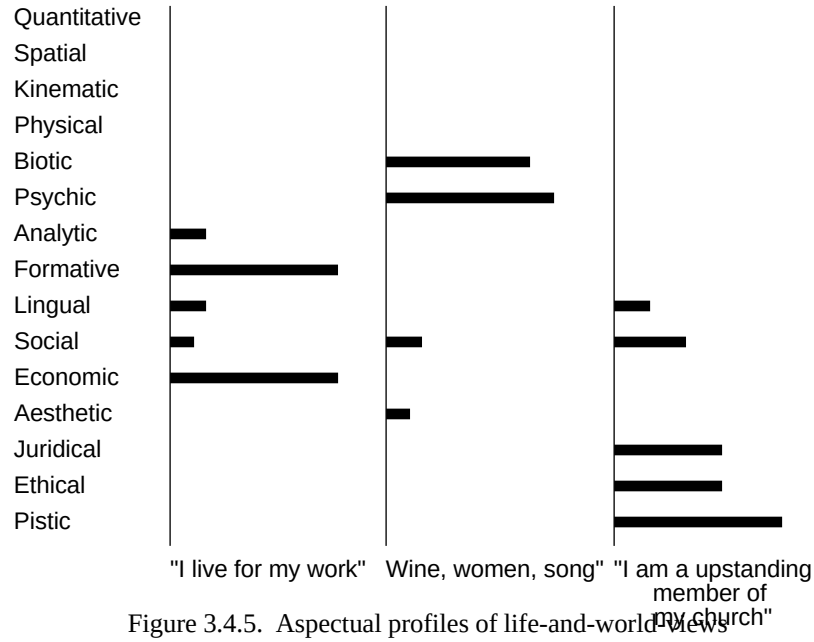

Figure 3.4.5. Aspectual profiles of life-and-world views

Understanding the aspectual profile, whether of everyday life or of a professional research community or journal can help in formulating frameworks for understanding the area concerned because it provides a way to understand the values and assumptions that drive both research and practice in the area. That LWVs are religious in nature implies pistic commitment, which is useful in understanding conflicts, in chapter 6.

But LWVs are not static. Individual profiles and those of small groups can be modified, because of pistic functioning, by life experiences or environment (the impact of ICT as an environment is considered in chapter 8). But also, when a LWV is strongly reductionist, which many scientific ones are, it can become suddenly overthrown because all aspects pertain, including those ignored by it (§3.1.4). One example is the sudden shift from behaviourist to cognitive psychology in the 1970s. Another is the various dialectical swings in environmentalism [Basden, 1999].

3.4 HUMAN LIFE

In Dooyeweerd, 'human being' may be understood in two ways: the human person (where we are concerned with characteristics of human living), and the human self or 'I'. The ontic status of the human self as Dooyeweerd understood it was briefly outlined earlier, but it is an understanding of the living human person that is more relevant to formulating frameworks for information systems.

3.4.1 The Human Person

The human person is seen in Dooyeweerd as multi-aspectual agent, active as subject in every aspect. In everyday life, this aspectual approach could inform our ideas of what it means to be 'fully human'. Table 3.4.1 gives examples, to be referred to when the issue of full humanity is important, such as in IS development (chapter 6), IS usage (chapter 4) and the gender issue (chapter 8).

This multi-aspectuality of the human person precludes a science of human behaviour as such [Dooyeweerd, 1984,II,p.55]. Rather, the various sciences allow us to study various aspects of the human person. This emphatically means that the study of the human person cannot and must not be reduced, as it has often been in the past, to such sciences as psychology, rationality, linguistics or sociology. Anthropology is, instead, a branch of philosophy, because it is philosophy which enables us to consider multiple aspects.

This view can enrich the various human sciences, in relation to each other. Each science tends to focus on a single aspect (see earlier), and thus has no basis for anticipating and differentiating later aspects. For example psychology, especially the forms that are most frequently referred to in IS research communities, tends to assume that such diverse human functionings as love, religious adherence, friendship and artistic appreciation can all be viewed as merely mental phenomena. Likewise social sciences tend to conflate post-social aspects into the social. But if the multi-aspectual view of the human

person is kept in mind, this invites the psychologist or sociologist (whose central aspect is the psychic or social) to be always aware that there are later spheres of meaning and law, which retrocipate their central aspect in different ways and whose meaning may be found to impact on that of their aspect by dependency and analogy (§3.1.4). Thus they can begin to differentiate, for example, different types of mental phenomena or social relationships without feeling compelled to account for these differences from within their own special science. This is why psychology or social theory alone find it difficult to provide a comprehensive framework for understanding IS that is truly sensitive to everyday life.

Table 3.4.1. Examples of aspects of being fully human

Aspect	.. of being fully human
Biotic / Organic	Healthy
Psychic / Sensitive	Emotionally stable Good eyes, ears, motor control.
Analytic	Clear thinking, logical
Formative	Planning, achieving
Lingual	Articulate, multi-lingual Good diagrammatic skills
Social	Friendly, sociable, charismatic
Economic	Careful, frugal
Aesthetic	Delightful, enjoying life, interesting and interested
Juridical	Just, proportionate, Good citizen, alert and active
Ethical	Generous, self-giving
Pistic	Loyal, of good morale,

3.4.2 Multi-aspectual Human Functioning

That human living, acting or behaviour is multi-aspectual has been alluded to before. But it needs to be made more explicit and its implications discussed because of its importance in all areas of research and practice is IS. It means that human behaviour involves functioning in a variety of aspects (usually all of them). Aspectual functioning does not refer to different parts of such behaviour, but to different ways in which it can occur meaningfully. Table 3.4.2 shows (some of) the functioning in all the aspects while creating a book like this, and may be used as an example when multi-aspectual functioning is important (chapters 4, 6).

Multi-aspectual functioning is not just a bundle of aspectual functionings; there is a coherence of meaning in it, made possible by the inter-aspect relationships and the inter-aspect harmony (§3.1.4). It is not only richer than a uni-aspectual view of functioning such as those offered by psychology, linguistics or economics, but also more 'true', in that everything is interconnected, and the meaning of any

aspect of our functioning cannot be discerned properly without reference to all the other aspects. This multi-aspectual richness of meaning is important in understanding everyday life (see below), and this includes especially human usage of computers and IS development (chapters 4, 6).

Table 3.4.2. Multi-aspectual functioning in writing book

Aspect	**Functioning in writing book** (examples)
Quant'tive	Word count
Spatial	Size of diagrams
Kinematic	Movement while drawing, writing
Physical	Paper jams in printer!
Biotic	Stuffy air hinders thinking
Sensitive	Moving my fingers. Seeing what I've written.
Analytical	Differentiating between ideas that seem similar
Formative	Structuring my sentences and diagrams
Lingual	Writing and drawing to convey what I intend
Social	Obtaining support and critique
Economic	Size limit on document, Keep backups. Manage time carefully
Aesthetic	Ensure the work integrates; Pleasant style of writing
Juridical	Do justice to topic, readers, publishers in my writing.
Ethical	Write generous prose that gives more than is due
Pistic	Ways I see myself: see text.

Nor is our multi-aspectual functioning the integration, or synthesis, of originally-separate aspectual functionings. Rather, it is a whole that is meaningful in a variety of ways. Dooyeweerd used the term 'systasis' to denote such integrality-prior-to-separation-into-aspects.

3.4.3 The Shalom Principle

Human living is multi-aspectual. All but the earliest aspects are normative. Therefore human activity exhibits diverse normativity. Our functioning and repercussions in one aspect might be Good or beneficial while in another they might be Evil or harmful. So analysis of the quality of human behaviour will be enriched by considering positive and negative functioning in all aspects separately. This is especially useful in understanding success and failure in IS (chapter 4).

If, as Dooyeweerd believed, the aspects are in harmony (§3.1.4), then it is possible in principle to achieve what Van der Kooy [1974,p.40-41] calls 'simultaneous realization of norms'. This leads to what might be called the shalom principle: that if we function well

in every aspect then things will go well, but if we function poorly in any aspect, then our success will be jeopardized. It may be, like Habermas' ideal dialogue, a counterfactual ideal, but it is useful as a conceptual tool for addressing the normativity of different areas of research and practice because it provides a basis for understanding the diverse normativity we encounter in everyday life. It also prevents false justification of actions that bring benefits in one aspect (e.g. the economic) while bringing harm in others (e.g. the social). The danger that stressing the irreducibility of aspects can lead to fragmentation, expressed earlier, can be ameliorated by the shalom principle. It has been employed, for example, by Brandon and Lombardi [2005] to address the diverse aspects of urban sustainability.

Perhaps the most attractive feature of this Dooyeweerdian approach is that it enables us to consider the rich normativity of the lifeworld. We are continually responding to the norms of all the aspects all the time, but not always aware of them as norms. For example, when I write my computer programs, I am continually sensitive to such things as:

"I'd better make this easier to understand" (lingual norm)
"If I do this, I'll make it more efficient" (economic norm)
"I'm tempted to take a short cut here, but that would not do justice to what I'm trying to express here" (juridical norm)

-- though I sometimes go against such norms. This is what Dooyeweerd's theory of norms is about. It is not primarily a set of social or religious Dos and Don'ts, but rather a framework within which we live and prosper and bring blessing to the whole Creation. As Goudzwaard [1979,p.243] said,

> "The purpose of norms is to bring us to life in its fullness by pointing us to paths which safely lead us there. Norms are not straitjackets which squeeze the life out of us. I stated as my conviction that the created world is attuned to those norms; it is designed for our willingness to respond to God and each other. If man and society ignore genuine norms, such as justice and restitution of rights, respect for life, love of neighbour, and stewardship, they are bound to experience the destructive effects of such neglect. This is not, therefore, a mysterious fate which strikes us; rather, it is a judgment which men and society bring upon themselves."

3.4.4 Brief Comparison with Extant Views of Ethics

Compared with most approaches to ethics, Dooyeweerd's allows us to distinguish different types of dysfunction or evil, such as in Table 3.4.4, which might be useful reference when considering detrimental impacts of IS (chapter 4).

A number of distinct types of ethics have been discussed but, especially in applying them to ethics of IS, there is a tendency to absolutely separate each from others, often denigrating them in the process. But a Dooyeweerdian approach would rather recognise the insight in each and integrate them. For example, MacIntyre's [1985] notion of eudaimonia is not unlike shalom, but Dooyeweerd provides a basis for understanding its diversity and coherence. It encompasses

several extant approaches to ethics. The idea that good is adherence to aspectual law is deontological (only approximately, because Dooyeweerd differentiates aspectual law from humanly-created and -agreed rules). The notion of repercussions echoes functional and teleological approaches. The way aspects define what is good and meaningful echoes axiological approaches. The notion that it is a human being who is subject to all aspects and tends to respond in certain ways echoes virtue ethics. Emancipatory ethics, as pursued by critical social theory, may be seen as shalom (as discussed in chapter 6). And the long timescales of later post-social aspects, especially the pistic, echoes Lonergan's [1992] long-term ethics of longer cycles of decline or creation and healing. The possibility of such integration, exploration of which cannot be pursued here, is due in no small measure to Dooyeweerd's notion of law and subject (§2.4.4).

Table 3.4.4. Dysfunction or evil in each aspect

Aspect	Dysfunction
Biotic / Organic	Disease
Psychic / Sensitive	Emotional instability
Analytic	Confusion
Formative	Laziness
Lingual	Lying
Social	Hatred, disrespect
Economic	Waste, squandering
Aesthetic	Boredom, Ugliness
Juridical	Injustice
Ethical	Selfishness, self-centredness
Pistic	Idolatry, disloyalty

A fundamental philosophical requirement for realizability of normativity is that the basis on which we make normative judgement must be the same as that which enables and empowers us to take corrective action. The Humean and Kantean divorcing of Is from Ought effectively brought much Western thinking into this unfortunate position. But Dooyeweerdian aspects are both what enable us to function and also define our norms. So Dooyeweerdian ethics are, in principle, realizable -- though a false orientation of the self (see above) in practice prevents this.

To liberal Western individualism, law is seen as an oppression, but to Dooyeweerd, aspectual Law is an enabler, without which nothing would be possible. Enabling as well as constraining has also been emphasised by Giddens [1993,p.129ff/B2]. But Dooyeweerd did not just note this but saw it as part of our destiny.

3.4.5 Everyday Life: The Lifeworld

The need to understand and be sensitive to the everyday lifeworld of research and practice in each area has been emphasised throughout. Some characteristics of the everyday lifeworld were outlined in chapter 1, with implications for lifeworld-oriented frameworks for understanding. How compatible is Dooyeweerd with these and how may Dooyeweerd contribute to such lifeworld-oriented frameworks for understanding?

Though Dooyeweerd did not explicitly set out a theory of the lifeworld, and never actually used that term, preferring instead the words 'naïve', 'everyday' or 'pre-theoretical', he referred to it continually throughout [1984]. In almost all places at which he referred to this, it was to its structure rather than its content. (Lifeworld content is actual assumptions prevalent in a culture; structure is nature and characteristics of lifeworld; see chapter 1.) This gives his deliberations a cross-cultural relevance that is second to none. Here we draw together some implications of his thinking and, where possible, his actual statements about everyday experience and attitude, to enrich the characteristics outlined earlier.

The lifeworld as basis for intersubjectivity, which makes concepts meaningful in a community. Dooyeweerd differentiated between meaning we attribute to things, events, concepts, etc. of the subject side as social beings, and cosmic, law-side meaning of which we have a more-or-less intuitive grasp.

The diversity, meaning and normativity of the lifeworld are all guaranteed by Dooyeweerd's notion of aspects. His suite of aspects provides a very practical set of categories with which to analyse it. The aspects are the spheres of meaning that we encounter in our everyday experience, rather than being theoretically derived.

The lifeworld is a "pre-given reality with which we must cope" [Schutz and Luckmann, 1989,p.1]. Dooyeweerd differentiated between law-side and subject-side givenness. On the subject side, we give respect to each individual. On the law side, we respect and seek to love and know intimately the cosmic meaning that is the kernel meanings of the aspects (even though we can never fully know them).

Lifeworld is engagement. On the subject side we accept the multi-aspectual richness of everything and, subject to aspectual law, we engage with all things aspectual subject-object and subject-subject relations. On the law side, the very framework of law and meaning that enables us, we are always engaged with.

How do we think about, and get to know, the lifeworld? First, Dooyeweerd [1984,III,p.28-36] warned against confusing naïve experience with sensitive functioning (he criticised Naïve Realism for confusing the two, and especially in Bertrand Russell). Second, it can never be known by theoretical thought, which concurs with Habermas' poetic description of it 'dissolving' as we take it up piece by piece (see chapter 1). Dooyeweerd accounted for this by his understanding of the nature of theoretical thought as involving

Gegenstand, by which things are pulled apart. The lifeworld resists being pulled apart. So it cannot be made fully explicit, and much is tacit. Intimate knowledge of concrete (subject-side) things is multi-aspectual, and hence fuller and more complete than analytical knowledge by which we separate them out. On the law side, we have an intuitive grasp of aspectual meaning. In what Clouser calls lower abstraction we become gently aware of the distinct aspects of things, but there is a danger of departing from a lifeworld attitude if we focus on one aspect to the exclusion of others. Higher abstraction, by which we isolate an aspect, is when we depart more completely from a lifeworld attitude.

The lifeworld attitude differs fundamentally from the theoretical attitude. While the lifeworld attitude involves aspectual subject-object or subject-subject relations, and especially multi-aspectual knowing, the theoretical attitude involves Gegenstand relations. Dooyeweerd was clear that "naïve experience ... does not know of a Gegenstand" [1984,II,p.431].

Nevertheless, Dooyeweerd [1984,III,p.31] held that "The naïve attitude cannot be destroyed by scientific thought. Its plastic horizon can only be opened and enlarged by the practical results of scientific research." Therefore everyday life can indeed involve ICT.

It will be noticed that some of the above may be differentiated into law- and subject-side versions. This helps enrich analyses. This Dooyeweerdian approach would point to there being two sides to the lifeworld, or perhaps, we might venture to say, two lifeworlds: law-side and subject-side.

3.5 CRITIQUE OF DOOYEWEERD

Sadly, most of the criticism levelled at Dooyeweerd has been from fellow Christians who mistook his philosophy as an attack on aspects of their theology or even on theology as a whole. With Dirk Vollenhoven who was also working on a similar approach to philosophy, Dooyeweerd was once accused on heresy and brought before a religious court. An interesting story, which reflects the radical status of Dooyeweerd's thinking, but most of the criticisms from the Christian community are of little relevance to this work.

There is also a tranche of criticism that reflects back more on the pre-theoretical stance of the criticiser than being an actual criticism of Dooyeweerd as such. The comment of one colleague, "It's too essentialist for me", is one such -- he did not even attempt to understand that Dooyeweerd is no essentialist, but reacted against an immediate impression arising from his own adherence to the Nature pole of NFGM than from any real attempt at critique. Such criticisms are ignored.

Several people have criticised Dooyeweerd for using abstruse or ambiguous terminology or otherwise being difficult to understand. Such criticisms are also ignored.

Some criticisms reflect more on those who have used

Dooyeweerd's thought than on the thought itself. Klapwijk sees Dooyeweerdian thought, and especially how it has been worked out in America, as too antithetical to other types of thought. But this seems to be the fault of those who adopted his thought and Dooyeweerd's intention was to engage. Choi points out [2000, §331] "Dooyeweerd is also open to positive fruits of non-Christian cultures seen as gifts of God's common grace. For instance, he considers the Roman ius gentium as such a gift. Thus it is not correct to say that Dooyeweerd is totally negative to non-Christian cultures. Rather he is very careful in his assessment of other cultural heritages."

A number of criticisms are of Dooyeweerd's failure to address certain issues. Nash [1962], for example, noted that Dooyeweerd had yet to engage with Anglo-Saxon thought in the USA and linguistic analysis; his thought has still not engaged with the linguistic turn in philosophy, though it did with historicism. A colleague has suggested that Dooyeweerd does not seem to address issues of democracy, participation, emancipation, and the like. In view of his social theory and juridical theory, one might have expected much more discussion of these things.

It is also unfortunate that Dooyeweerd did not engage with social constructivism, which is so important in many areas of information systems. Many Dooyeweerdian thinkers instinctively react against it (seeing it as a denial of reality, even the reality of God!). But, in this author's view, the two are largely compatible once one differentiates law from subject side. In practice, social constructivism seems to concern itself with subject-side occurrence, which Dooyeweerd himself stressed was open-ended and highly plastic, and as having an important social dimension. Moreover, the importance of discourse in social construction has its place in Dooyeweerd, in the lingual aspect. It is the law side which transcends us. Extreme social constructivists will no doubt dislike any whiff of that, but philosophically, if one challenges them how social construction is itself possible, one must fall back on something exhibiting similar characteristics to Dooyeweerd's law side. The contact between these two streams has yet to be seriously explored.

It has also been suggested that while Dooyeweerd's theory of internal structural principles is excellent, he did not give much attention to the individual that actually occurs as a response to that law. This would seem not just a lack but a real gap. This is what social constructivism concerns itself with.

Dooyeweerd's suite of fifteen aspects may obviously be criticised (even though, as argued above, it might be the best available). See, for example, Seerveld [1985], De Raadt [1997], Stafleu [2005] and Basden [2006]. This is an on-going process which Dooyeweerd expressly welcomed [1984,II, p.556].

However, there have been a number of more substantial philosophical criticisms recorded from within the Dooyeweerdian community itself, which are here summarised. A discussion of a number of them may be found in Choi [2000], to which this author is indebted.

Dooyeweerd's transcendental critique of theoretical thought comes in for several criticisms. While Klapwijk [1987] applauds it for making "the structure of theoretical thought transparent", he suggests that his transcendental epistemology and cosmology form a vicious circle. This might reflect a misunderstanding on Klapwijk's part that arises from ambiguity in Dooyeweerd's writings; Clouser's [2005] clearer rendering of Dooyeweerd's transcendental critique does not seem to exhibit this vicious circle, though Klapwijk has yet to comment on whether this is so.

Choi [2000] criticised Dooyeweerd's attempt at cultural critique for being too abstract and theoretical and orientated mainly to the state and society than to culture as such, and not attracting the attention from other scholars that it deserved. Choi nevertheless believes [§333] "It gives marvellous insight into understanding the root and dilemma of Western culture throughout its history ... but also offers insight into the possibility of reforming or transforming it from a Christian perspective." Choi's criticism was thus only that Dooyeweerd did not work on this issue as fully as Choi had wished.

Klapwijk points out that Dooyeweerd and others (e.g. Vollenhoven) are adamantly opposed to 'synthesis-philosophy' (NGGM) while, in another place, Dooyeweerd argues that synthesis-philosophy is impossible. How can one be opposed to what is impossible? But this apparent inconsistency might be explained if Dooyeweerd was working at two levels, the first as a human being with belief-commitments, the second as an analytical thinker.

Olthius [1985] criticises Dooyeweerd's notion of the supra-temporal self as being too like Plato's notion of an eternal realm of Forms, and as leading to dangerous duplication in his philosophy.

Dooyeweerd's view of time and progress (which is explained in chapter 8) comes in for criticism from some. McIntire [1983] criticised his notion of time from several angles, most of which are not relevant here, but the root of which is that he criticised Dooyeweerd for conflating the problem of unity and diversity with that of time -- but that might be seen as a philosophical insight of Dooyeweerd's rather than a deficiency. More relevant to us, Klapwijk [1987,p.123] criticised Dooyeweerd's concept of culture and progress as the unfolding of aspects as "a speculative product of German idealist metaphysics of history" which has "romantic-organismic, progressivistic and universal-historical connotations", rather than as truly emerging from his main thought. "Dooyeweerd continued to espouse the basic idea of a universal-progressive process of disclosure that in one way or another eventuates, as it turns out, in modern Western culture."

But there has been very little, if any, criticism of the portions of Dooyeweerd's thought that are of most interest here -- including the primacy of meaning, the non-Cartesian law-subject-object relation, the exposing of religious roots, the notion of aspects a spheres of law and meaning, the approach to things, and the respect for everyday experience. As far as this author is aware, critique of these has yet to

occur. Maybe the proposals in this work will stimulate application of Dooyeweerd's thought which will then lead to critique.

Dooyeweerd himself welcomed criticism, and the criticism levelled at his first magnum opus [1935] led to significant revision of his thought. But even after this he was relatively modest about his philosophy, acknowledging that much of it stood in need of critique and refinement, and he was rather disappointed that it received so little good quality attention. The reason for his modesty is to be found partly in his Christian faith, that sees humility as a virtue, but is also to be found in his philosophy itself. As outlined above, philosophy is not some avenue to absolute truth, because all we do and are is non-absolute. In particular, its central analytical aspect is non-absolute. Therefore every philosophy, including his own, must be questioned.

However, there has, unfortunately, been very little if any substantive criticism of Dooyeweerd from the communities of mainstream philosophy, nor even any attempt to engage with Dooyeweerd despite its radical approach. This might be because people assume, wrongly, that because he spoke about a 'Christian philosophy' his thought must be irrelevant. But it is probably also due to the characteristics of the current streams of philosophy themselves that limit their capacity to understand Dooyeweerd immanently. Analytic philosophy finds most of the issues he dealt with meaningless. Likewise positivism. Postmodernists will be put off by what they (mistakenly) dismiss as a 'grand narrative' running though Dooyeweerd's work. Neo-Kantian thought will be upset by Dooyeweerd's severe criticism of it (despite his obvious admiration for Kant as such). Phenomenology and existentialism might empathise with much of what Dooyeweerd was talking about, but will not be able, from within their own thought, to truly understand his separation of law from subject side and his overcoming of the Kantian gulf. Critical theory might like Dooyeweerd's recognition of transcending normativity and the possible enrichment of their notion of emancipation, but Habermas' Theory of Communicative Action is so unquestionly accepted now (almost an absolutization of the lingual aspect) that critical theorists are unlikely to recognise the validity of the other spheres that engaged Dooyeweerd.

The problem is that Dooyeweerd worked at a level deeper than the wars between Humanism and Scholasticism, between pre- and post-Kantian thought, between positivist, interpretivist and criticalist thought, between modernism and postmodernism. Until that is understood, no serious critique from mainstream philosophy is possible. It will probably take someone of the calibre of Jürgen Habermas, who, like Dooyeweerd, has engaged in careful immanent critique of other thinkers and transcendental critique of issues, to sensitively yet powerfully get to grips with what Dooyeweerd was trying to do, understand it in its own terms, not get sidetracked by secondary issues with which Dooyeweerd's text is sprinkled, and on that basis make a real critique.

3.6 CHAPTER CONCLUSION

This chapter has explained and discussed some portions of Dooyeweerd's thought which will be used in formulating frameworks for understanding research and practice in IS. It should be clear that all the main branches of philosophy are represented in Dooyeweerd:

- # Ontology: his approach to things, but at a deeper level, which is not strictly ontology, his general theory of modal aspects
- # Epistemology: his approach to knowing, including his re-examination of the epistemological problem itself
- # Philosophical ethics: the intrinsic normativity of the aspects as spheres of law, and the shalom principle
- # Methodology: the normativity of the aspects as guidance for the future
- # Philosophical anthropology: multi-aspectual human functioning as human living, plus the human self
- # Critical philosophy: his immanent critique of thinkers and his transcendental critiques to expose the nature of theoretical thought, including its religious root as presuppositions.

The next five chapters apply them, along with a few notions introduced in chapter 2, to that task. Some ideas are derived from Dooyeweerd rather than used by Dooyeweerd himself; they will be differentiated where necessary by the use of the adjective 'Dooyeweerdian' rather than 'Dooyeweerd's'.

References

Adam, A. (1998). Artificial knowing: Gender and the thinking machine. London: Routledge.

Basden, A. (1999). Engines of dialectic. Philosophia Reformata, 64, 15-36.

Bernstein, R. J. (1983). Beyond objectivism and relativism: Science, hermeneutics and praxis. Philadelphia: University of Pennsylvania Press.

Boden, M. A. (1990). Escaping from the Chinese room. In M. A. Boden (Ed.), The philosophy of artificial intelligence (pp. 89-104). Oxford, England: Oxford University Press.

Brandon, P. S., & Lombardi, P. (2005). Evaluating sustainable development in the built environment. Oxford, England: Blackwell Science.

Bunge, M. (1979). Treatise on basic philosophy, Vol. 4: Ontology 2: A world of systems. Boston: Reidal.

Burrell, B., & Morgan, G. (1979). Sociological paradigms and organisational analysis. London: Heinemann.

Clouser, R. (2005). The myth of religious neutrality: An essay on the hidden role of religious belief in theories (2nd ed.). Notre Dame, IN: University of Notre Dame Press.

Dahlbom, B., & Matthiassen, L. (2002). Computers in context: The philosophy and practice of systems design. Oxford, England: Blackwell.

De Raadt, J. D. R. (1997). A sketch for humane operational research in a technological society. Systems Practice, 10(4), 421-441.

Dooyeweerd, H. (1984). A new critique of theoretical thought (Vols. 1-4). Jordan Station, Ontario, Canada: Paideia Press. (Original work published 1953-1958)

Dooyeweerd, H. (1999). In the twilight of Western thought: Studies in the pretended autonomy of philosophical thought. Lewiston, NY: Edwin Mellen Press.

Geertsema, H. G. (2000). Dooyeweerd's transcendental critique: Transforming it hermeneutically. In D. G. M. Strauss, & M. Botting (Eds.), Contemporary reflections on the philosophy of Herman Dooyeweerd (pp. 83-108). Lewiston, NY: Edwin Mellen Press.

Geertsema, H. G. (2002). Which causality? Whose explanations? Philosophia Reformata, 67, 173-185.

Giddens, A. (1993). New rules of sociological method. Cambridge, England: Polity Press.

Goudzwaard, B. (1979). Capitalism and progress, a diagnosis of western society (J. Van Nuis Zylstra, Ed. & Trans.). Grand Rapids, MI: Eerdmans.

Hartmann, N. (1952). The new ways of ontology. Chicago: Chicago University Press.

Heidegger, M. (1971). Poetry, language and thought (A. Hofstadter, Trans.). New York: Harper Collins.
Henderson, R. D. (1994). Illuminating law: The construction of Herman Dooyeweerd's philosophy. Amsterdam: Free University.
Hirst, G. (1991). Existence assumptions in knowledge representation. Artificial Intelligence, 49, 199-242.
Husserl, E. (1970). The crisis of European sciences and transcendental phenomenology (D. Carr, Trans.). Evanston, IL: Northwestern University Press.
Klapwijk, J. (1987). Reformational Philosophy on the Boundary between the Past and the Future. Philosophia Reformata 52.
Van der Kooy, T. P. (1974). De gereformeerde wereld en de sociologie [The Calvinist world and sociology]. Anti-Revolutionaire Staatkunde, 2, 37-56.
Lonergan, B. (1992). Insight: A study of human understanding. Toronto, Ontario, Canada: University of Toronto Press.
MacIntyre, A. (1985). After virtue: A study in moral theory. London: Duckworth.
Maslow, A. (1943). A theory of human motivation. Psychological Review, 50, 370-396.
McIntire, C. T. (1985). The legacy of Herman Dooyeweerd: Reflections on critical philosophy in the Christian Tradition. University Press of America.
McIntire, C. T. (1983). Dooyeweerd's philosophy of history. In C. T. McIntire (Ed.), The legacy of Herman Dooyeweerd: Reflections on critical philosophy in the Christian tradition (pp. 41-80). Lanham, NY: University Press of America.
Mingers, J. C. (1992). Criticizing the phenomenological critique - autopoiesis and critical realism. Systems Practice, 5(2), 173-180.
Nash. (1962). Dooyeweerd and the Amsterdam Philosophy, Zondervan.
Olthius, J. M. (1985.) Dooyeweerd on religion and faith. In C. T. McIntire (Ed.), The legacy of Herman Dooyeweerd: Reflections on critical philosophy in the Christian tradition (pp. 41-80). Lanham, NY: University Press of America.
Polanyi, M. (1962). Personal knowledge: Towards a post-critical philosophy. Chicago: University of Chicago Press.
Polanyi, M. (1967). The tacit dimension. London: Routledge and Kegan Paul.
De Raadt, J. D. R. (1991). Information and managerial wisdom. Pocatello, ID: Paradigm Publications.
Schutz, A., & Luckmann, T. (1989). Structures of the life-world, volume 2. Evanston, IL: Northwestern University Press.
Seerveld, C. (1985). Dooyeweerd's legacy for aesthetics: Modal law theory. In C. T. McIntire (Ed.), The legacy of Herman Dooyeweerd: Reflections on critical philosophy in the Christian tradition (pp. 41-80). Lanham, NY: University Press of America.
Smircich, L. (1983). Concepts of culture and organizational analysis. Administrative Science Quarterly, 28, 339-358.
Stafleu, M. (2005). On the character of social communities; the state and the public domain. Philosophia Reformata, 69(2), 125-39.
Strauss, D. F. M. (2000). The order of modal aspects, In D. G. M. Strauss, & M. Botting (Eds.), Contemporary reflections on the philosophy of Herman Dooyeweerd (pp. 1-29). Lewiston, NY: Edwin Mellen Press.
Winch, P. (1958). The idea of a social science. London: Routledge and Kegan Paul.