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The "5-C Model" for Guiding Science and Technology: A Précis of Reasonable Moral Practice Amidst a Diversity of Worldviews

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Abstract

Moral practice and culture is supported and guided by various worldviews and religions; but at times worldviews have also depressed and destroyed ethics and civilizations. In this essay I present a view of five species-specific human capacities that I suggest have formed individuals and communities for millennia, independently of their specific worldview. Namely, these are Communication, Cooperation, Competence, Compassion, Cultivation. I posit that this 5-C operating system of reasonable and successful practice is interconnected with orientational systems in each and every ideology, philosophy and religion. Worldview systems review the benefits and risks of their practice in light of their own universals and visions. Herein, I posit that the 5-C system may provide a viable model to guide scientific and technological research, review, and uses, as well as the review and change of the social, economic and political structures that are the fabric of human activity and culture. While the practice system cannot verify inherent truths of orientational teachings, it does present the practical consequences of worldviews in the ethics of science, technology, business, and politics. Here, the 5-C operating system is presented as a general field theory and an open-source approach to successful planning, reviewing, and executing knowledge and tools (viz-. science and technology) in practice within the personal and professional spheres of individuals and operational communities.

Keywords: 5-C, communication, compassion, competence, cooperation, cultivation, ethics, science, technology, practice, theory, worldview

Introduction

There are two human species-specific operating systems for survival and for living a good life: the field of practice and the field of orientation. These are closely interconnected, and we find them in all cultures and traditions. The field of faith and vision supports and directs the fields of practice and action beyond the sheer needs for survival. The field of practice provides for survival and strivings toward the good life up to the limits of human capacities, technologies, and cultures. The system of practice is, without any prior experience or knowledge, a priori operational by species-specific properties in all cultures independently of their religious, philosophical or ideological system. Variations in systems of practice depend on the visions and goals of individuals and communities, on their skills in cooperation and in science and technology, also on the availability of natural and societal resources. Yet, all cultures and operational communities depend on the use and improvement of these five natural human traits, which I call the 5-C capacities: communication, cooperation, competence, compassion, cultivation.

The field of orientation is much more diverse and cannot be described by a limited set of orientational concepts. While the orientational operating system seems to be an a priori human property as well — as Rudolf Otto, an early Christian philosopher has stated: 'the human soul originally is religious' (*anima humana originaliter religiosa*), i.e., bound back to something superior, powerful, demanding, almighty and merciful, both terrifying (*tremendum*) and fascinating (*fascinans*), an original numinous (*numinosum*) human understanding of a reality beyond rational and sensory experience (1). These powers are found in monotheistic and polytheistic systems, in animism, in the withdrawal from earthly practice into meditation, also in cultural visions of final liberation from the wheels of karma and life (2). Given the diversities of worldviews and their authentication by investigation, empiricism, revelation, spiritual insight, or prophecy, it is understandable that worldviews and religions have fought each other for orientational persuasion and dominance.

All orientational systems seem to use the 5-C capacities in order to form, expand and cultivate the realm of their existence and the social and environmental cultures of their community, and thus they can be reviewed and measured in practical terms by the consequences of their real-life actions. In this way, the 5-C properties may serve as the basis for (a) devising, improving, and protecting successful moral and cultural environments, (b) establishing foundational parameters with which to view, guide and regulate scientific and technological research and various applications in and across pluralist societies, and for (c) reviewing worldviews and religions with regard to their their contributions to, and engagement of science, knowledge and technology toward peaceable, harmonious, and cultivated communities and cultures. In this essay, I provide a précis of the 5-C system, in an attempt to establish the basis for its use and applications, also for the review of successful or failed communities and individuals. First, it is necessary to afford a short review of those philosophical orientations and ideas that have been historically important to define and shape the modern contexts of human endeavors, inclusive of science and technology.

The a priori Operating System of Reasonable Practice

Immanuel Kant in 1781 described the operating systems for human reasoning and for the recognition of the natural world (2). He claimed, that *time* and *space*, together with other intuitions such as *causality*, are prior to all experience. In his view, they are species-specific properties which humans and other forms of life use naturally to orient ourselves and to work in the world. Kant argues transcendentally but modern anthropology and comparative biology tend to support his view and establish their findings without transcendental deductions. There are, indeed, species-specific properties. Humans cannot live under water like fish nor fly as birds do, nor smell as dogs can. But, using specific capacities of knowledge and skill, we compensate very well missing those specific properties by building SCUBA devices and submarines (for living under water), airplanes (to fly higher than any bird), and technical devices which are much more efficient than the noses of dogs and the eyes of predatory birds (2). Humans have been described as *animal rationale*, the living being that has "brain power", the *animal sociale*, the living being that "lives in community", and the *homo ludens*, the living being that "loves to play".

Kant also claimed that other important concepts and visions such as freedom, deities and immortality are not *a priori* and universal in their content, but are essential human visions nonetheless, with the effect of supporting morality and culture, doing good, living well and hoping for better. While they cannot be proven by reason, they also cannot be disproved. As Voltaire said, these ideas have been invented for the sake of morality and society in order to encourage civilized behavior (3). Kant did not have a concept of the 5-C properties, instead, he and based his moral teachings on the Prussian ethos of *duty* (4). Friedrich Schiller, a Kantian, once complained that he served his friend well, but out of sympathy and compassion, not out of the Kantian "moral law" of duty alone (5). Arthur Schopenhauer, influenced by Hindu and Buddhist philosophy, made *compassion* the central moral law and called Kant's Categorical Imperative cold and egotistic (6).

When we look into the cultural history of humankind, into the history of technology, agriculture, and of civilizations, communities, cultures and states, we find that they have been built onthe basis, interaction and integration of the 5-C properties (of communication, cooperation, competence, compassion, cultivation). These capacities are proven and necessary conditions for all forms and manners of human action: indispensable for acquiring knowledge (i.e., *scientia*) and engaging such knowledge in the construction and use of tools (i.e., *techne*; *technologia*), indispensable for leading and cooperating in various forms of communities (i.e., *res politica*). They together

enable our human surviving and acting in the worlds of nature, culture and society, establishing and protecting all forms of community, thus being essential in much the same ways as insight to space, time, and causation are for empirical and existential understanding (7).

Kant had based his moral philosophy on a Categorical Imperative as an obligation independent from will, preference or nature as a moral law: "Act as if your maxims should serve at the same time as the universal law (of all rational beings)" (4). Because the 5-Cs can be shown to be essential human capacities prior to, and essential and unavoidable for each and any successful action, we may replace the Kantian duty-based maxim with a Reasonable Practice Imperative, that states "Act successfully by using and integrating communication and cooperation, competence and compassion for the cultivation of your own, and your communities". Closer to Kant's wording we could formulate: "Act based on your natural capacities for communication, cooperation, competence, compassion, cultivation, which at the same time will serve as the universal challenge of all human beings". Fritz Jahr, the father of modern bioethics, in 1926 rephrased the second version of the Categorical Imperative, which was originally restricted only to rational beings, into a universal Bioethical Imperative based on reasoned compassion: "Respect every living being on principle as an end in itself and treat it, if possible, as such!"(8). While the Kantian Imperative and the 5-C capacities are formal and content-free, either based on moral law or on species-specific capacities, the Bioethical Imperative is content-rich, addressing issues of survival and the good life within the worlds of living beings and living environment (9). This, e.g., has to be taken into account in neuromedical research and in the treatment of animals and other forms of life (10).

Successful Practice and Good Living

Given the formal and content-free nature of the 5-C human properties, processes of education, learning, training, improving, and cultivating are essential. Confucian traditions compares people to pearls: both are naturally precious, but both need polishing to become shining and really valuable (11). The Hebrew King David used a comparable narrative: "Iron sharpens iron and one man sharpens another; he who tends a fig tree will eat its fruit; and he who guards his master will be honored" (12). He must have thought of natural human abilities such as being able to communicate, to form teams, groups and societies, to work exactly and precisely with high levels of accuracy and professionalism, to care for others and to console those in despair and pain, to protect, improve and to cultivate what already had been achieved technically, socially, morally, and politically. In fact, the term 'cultivate' is based upon the Latin cultivare, to work the ground and the eradicate weeds. In this sense, we may view cultivation as a means of working the fertile grounds of human capability, guiding towards flourishing, but doing so in ways that eradicate the overgrowth of more deleterious aspects of our nature. But cultivation — in any sense — requires collaboration, as these grounds are not limited to the individual, but instead serve both selves and others. Thus it becomes important to engage in exchange of information about what is needed, desired and deemed "good" to enable cultivation to be meaningful and of greatest value. Communication serves this purpose. If the human ability to communicate is not developed in language, that particular person will not be able to develop her or his potentials, and may remain hostile, frightened and unsocial.

Communication is a basic human capacity, expressed in many different forms including body language and intonation. Also included in means of communication are technical terminologies, software and manuals of various kinds. Spinoza defined the concept of reliable and provable truth as: "truth is what I understand clearly and distinctly" (*Illud omne esse verum quod valde clare et distincte percipi*) (13). When facts and situations become more complex, more detailed and accurate terminology is needed, a reality often violated by ideologues exploiting people by lure and temptation with words and definitions. When we communicate with ourselves, such as in planning specific game strategies, devising a new machine, meditating, preparing for a presentation, or anticipating the various outcomes of a confrontation, then we self-respond to dialectical and confrontational possibilities, trying to find solutions and improving a culture of interaction. Written communication in books, letters, also objects of art, open the dimensions of communication far beyond our own direct experience and allow for human understanding, weighing, pondering, and calculating in drawing on the experiences and mistakes of multitudes of generations and cultures.

In general, speech and print are primarily directed to fellow humans in their role as family members, friends and team partners, adversaries, bosses, assistants, patients or clients. There are, of course, many distinctly different interacting and integrating levels of communication. Com-

munication in military, business, politics, and research have their own specific languages in terminology, also in the ways that information is shared or not shared. Thus, communication is rarely an end in itself. Communication is part of human practices. Teams, joint production, mutual aid, military or medical services are not possible without specific means and ends in communication. But as there limits to all human capacities, communication may be limited and/or fail. Heidegger called "language the house of Being", indicating that different languages, different terminologies and traditions express worldviews differently (14). Indeed, certain concepts are difficult to translate into other languages and cultures; the same can be said for professional languages and communications. The Tao is similarly skeptical about written characters that carry the message like a vessel carrying freight: "the Tao is only a term" (15). Mulla Sadra, an influential Persian philosopher of the 17th century, argued that "communicating is creating" as there are concepts which go beyond the words, but not without words (16). Not only the content, the forms and means of communication can as well be a medium to carry messages beyond the words, sounds and letters, and as such, they are also a source of misunderstanding.

Cooperation is a goal of many forms of communication. Cooperation cannot work, of course, without competence and skills. Stakeholders must bring specific skills in competence, communication or compassion to each situation, so as to meet practical challenges. Cooperation must be trust-based even in the most technical activities. In many settings, cooperation is guided by training, quality norms and/or contracts that spell out mutual obligations and rights. No compassion is necessary when torturers or robbers cooperate, but those activities do not lead to harmonious cultures or solutions; they orient themselves on misleading landmarks, leaving out interaction and integration with the human capacity of compassion.

Competence is essential in order to make communication and cooperation effective and successful. A knife, that is not sharp, will not cut. A sharp knife, when not correctly handled, is dangerous. Action requires expertise and continuous training, including experiences in cooperation, review, and in improving, protecting and cultivating the positive effects of competence in compassionate attitudes and lifestyles. Incompetent actions are dangerous in science, technology, medicine, politics, and in personal and social matters as well. The best intentions are useless and without results, if their application and realization are not executed competently and with expertise. Leadership and teamwork competence integrate not only technical skills but social, interpersonal and moral ones. Of course, there is also expertise in deception, stealing, and torture; but these are detestable disuses of one of these a priori human traits and capabilities.

Compassion, as already mentioned, is the most central capacity for morally successful actions. There are some technical goals that cannot be achieved without compassion, such as caring for the elderly, the frail and the weak; but all other cultural and moral goals as well will need refined and cultivated forms of situational compassion as well. Practice without compassion is blind and morally ineffective. Some technical activities may use other qualities as their prime point in orientation; but even the construction of kitchen machines needs to promote low risks in performance and handling so as to be safe and effective (and financially successful and sustainable), and that will be the same for compassionately understanding shortcomings of science, machines and men. Compassion without expertise is not effective and needs to conjoin and interact with other 5-C capacities. Compassion with the non-human environment is not just useful for future human cultures; it surpasses and refines the simple anthropocentric interest in the protection and cultivation of nature, as Lao Tze, Buddha, Francesco Assisi, Fritz Jahr, Indian Chief Seattle and many other voices of authority in worldview orientation have argued (17).

Cultivation had been a landmark and a goal throughout human cultural history. Improving and not slipping back into less safe, less enjoyable and less harmonious social and cultivated natural environments has always been a goal of making good things, attitudes, and morals more permanent. In the same way, we can regard the cultivating effect of educating the young generation to avoid mistakes of past generations and improve upon that which has already has been achieved. The road of morality and culture is not a one-way street. Often, as our forefathers and other cultures had to do, we must acknowledge those heading in opposite directions, develop 'rules of the road', and take detours and bypasses. So, individuals, operational teams and cultures in development can and should refine their practices and cooperation by learning from mistakes and by setting step-by-step rules to proceed easier and more comfortably, having learned from previous trials and errors. Cultivation is a process, not a fixed state; so is what we call culture. As Jacob Burckhardt (18) critically pointed out, the cultivation and progress of humankind

more often than not had to be defended against the fashion fads of history.

I maintain that the (widely overestimated) discrepancy between egoism and altruism will disappear or become smaller in integrated 5-C systems, as individuals and communities may evidence the reciprocal benefit(s) in practices that are served by both virtues (19). The French philosopher Gabriel Marcel, defined humans as *homines viatores*, itinerate people, individuals and groups on the road, changing and adapting to changing social and natural environments (20). Our personal lives are like journeys along the aforementioned road, enveloped in the ways of others near and far. To go from here to there, we need advice on territory, direction, risk, potential dangers and how to metaphorically improve our stance, gait pace — often through the use of knowledge, techniques and tools (viz., science and technology). We need many and different types of maps, and ultimately rely upon the help of others, i.e. communication and cooperation. Curiosity and determination support the drive, as do friends, comrades, colleagues, those who we rely upon and who rely on us, and in some ways and to some extent, even adversaries. Of note here is the consideration of the Nietzschean maxim: "what does not destroy me makes me stronger" (21).

The Diversity of Orientational Systems

As Kant has suggested, orientational truth as propagated by religions, ideologies and other worldviews cannot be proven beyond doubt, but also cannot be disproved either (22). Of course, there are different visions of culture and cultivation, informed by the tradition of prevailing societies, their own or other cultures, even determined by rulers and their selective use of the 5-C properties and the goals of government. It seems to be a benefit and not a harm that humans and human cultures have grounded themselves in different orientational models and their innumerable variations. For some, such a diversity is a proof of relative human freedom, creativity, and geniality in having so many landmarks for vision, faith and for the application and embodiment of the 5-C properties. For others, it is the invisible hand of the divine, in whatever form it exists or acts, to have revealed truths or a certain "Law of Nature". Because of the placidity of neuronal and ideational impression, the human brain can be manipulated towards many goals and practices, both good and bad, but it is always dealing with social interaction (23). Unfortunately also slaves and mindless followers have been made by reference to a "Divine Law" (22). Thus, orientational rhetoric must be checked against real-life moral practice. Bringing orientational messages into the realm of good practice has an important effect on compassionate and reasonable deeds. The human capacity to be impressed and formed may be the cause for cultural diversity and moral responsibility (24) .

It is an old, yet perdurable philosophical and theological question to ask what comes first and which of the two is more foundational, reasoning or acting: theory or practice? Most of the time, it is widely assumed, that reasoning and believing, philosophical or religious worldviews come first and form the foundation for practice, in particular for morally and culturally good action. From such a point of view, moral or immoral acts appear as footnotes and applications of commandments, rules, regulations, some of them developed by priests or philosophers, others indoctrinated by churches or tyrants, others collectively formed in closely knit cultural and social communities. But whether ethical theory actually is "foundational to the field and determinative in practice" , as philosopher Tom L Beauchamp, has discussed, or whether ethics instead remains disconnected to "the stumbling and confusing manner in which philosophers have attempted to link theory to practice" (25) still is under debate. Whether moral failure is due to the exploitation of ethical theories by ideologues and dictators or due to ill- fated and disastrous ways of relating theory to practice will require more ardent address and detailed answers, as the tempo of science and technology increase and as theories — and tools — are more rapidly translated into realties that affect human life upon each and every stage (25). I opine that unlike other ethical approaches, the 5-C model may provide a theory-free, open source for character formation, the development of individual and communal virtues, and the steering of human knowledge and accomplishments.

Independently from each other, different cultures have developed similar applications of the 5-C model with emphasis on empathy, expertise, compassion, and cultivation. The Kantian Categorical Imperative is similar to the Biblical "love your neighbor" and to the Vedic teaching that I (myself) "is you as well" (*tat tvan asi*) (17). The century-old Confucian doctor Yang Chan's advice to patients to "trust only those doctors who have a heart of compassion and humanness, who are clever and wise, sincere and honest" comports well with the classical European knightly virtues of "prudence, fortitude, temperance, justice" (17). I believe that most systems and

constructs of virtues or principles overlap, and while they reflect distinct cultural traditions, there may be grounds upon which to build a universal global dialogue to guide the use of science and technology (and human individual, social and political conduct) toward a future of reasonable and compassionate practice (9,24).

The orientational openness of humans may — and I hold *should* — be seen as a gift rather than a disadvantage or impediment. This openness has caused diversity, curiosity and various models of engagement in self-cultivation, in the support of others, and in cultivated natural and social environments. Of course, such a diversity has also given rise to extreme forms of orientation that violate the 5-C capacities in the refusal of communication or cooperation with "others", disrespect for the beliefs and visions of others, concentration on esoteric, "spiritual things" neglecting the realistic need of the sick and the frail in this world. Recent research in neuroscience may shed a light on the interactions between neuronal and cultural processes (26). In any case, there is a demand to both tear down those factors that impede cooperatively, compassionate, diverse global cultures of the future, and to pave the way for science and technology to be employed — at lest in some ways — to enable harmonious interactions between the operating systems of belief and of practice. Cooperation and consensus do not come by themselves; they have to be developed and cultivated in respect to other people's worldviews and visions. Tolerance and cooperation are inseparable in the protection and development of culture (27). The 18th century philosopher Moses Mendelsohn put it this way: "Brethren, if you want true peacefulness... let us not lie about consensus when plurality seems to have been the plan and goal of providence. No one among us reasons and feels precisely the same way the fellow-human does. Why do we hide from each other in masquerades in the most important issues of our lives..."(28). Spinoza underlined the close and essential interaction political safety and liberty, stating that freedom of reason and belief, and the security of state and community are not in conflict, but rather both are threatened when suppressed (29)

Conclusion

In this essay I have provided a précis of a 5-C model with which to orient, to guide and to direct scientific and technological research, advancement and applications as components of human activity and culture. I offer this model also as a system for moral grounding and directing successful and reasonable practice as universal, diversity-friendly, and globally applicable. In support of these claims, I have provided evidence that the qualities of the 5-C model have been embodied in different forms and have been inherent to all traditional cultures for millennia. In this way, I view these qualities as fundamental aspects of human moral development and action. Hence, I offer that a renewed devotion to the 5-C approach may be crucial for projecting and devising future cultural, scientific, technological and ethico-legal developments, and to review the strengths and limits of human interactions and reasonable practice(s) in various orientational systems and worldviews. In this way, I believe that the 5-C model may be helpful to review past and present developments, and identify specific opportunities, challenges, shortcomings, risks and/or dangers in science, technology and leadership, education and training in academia, commerce, government, the military, the media and a multitude of applications in the social sphere. Of course, the 5-C model will also help to critically analyze worldviews that eliminate, reduce, and violate these basic species-specific properties and to involve them and their followers in critical moral and cultural dialogue.

We are all "on the way" and we are on the way "together" with other fellow travelers (20) and with other forms of non-human life (30). Throughout human history, we have lived and hunted in natural and operational teams, collaborated to survive and flourish in natural and in man-made environments. But: from time to time unfortunately we also have turned our insights and skills against each other on fields of battle, extortion and betrayal. If this is the case, we need to discuss and to change by using the 5-C properties as a guiding tool.

In sum, I claim that if humanity is to continue to survive, given the ever growing capabilities for both flourishing and destruction, a system to direct human enterprise amidst pluralist worldviews and opportunities for both conflict as well as cooperation will be needed (31). What we need is not only reciprocity between science, technology, ethics and policy, as Giordano suggests (32), but a similar interaction of the 5 C's with science, technology, ethics and policy. The 5-C properties — and the presented model — have defensible merit as a fundamental system through which to enable harmonious, peaceful and yet diverse communities. I believe that in application, the 5-C approach will allow a more incisive view of the impact of religions, economics, politics and worldviews on the cultivating and harmonizing of people and communities.

In essays to follow, I shall provide both embellishments upon this model, and speculations and examples of its use(s) in practice in the application, promotion and review of science, technology, and political affairs.

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Competing interests

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