Prelude
I sometimes find myself struggling in a situation where what I do is not
accordant with what I know because of my self-centered mind, negligence
or institutional demands. Whatever the reason might be, my action in that
case always results in feelings of discomfort, lack of fulfillment and regret.
Doubting the integrity of my action, the result weakens, fragments, and
devalues my being. In the classroom, I also see my struggles lurking
behind my teaching from time to time. I try to cope with the situation but it
is not always successful.

How do I want to live as a human being and a teacher? Many times, I have
tried to avoid this deep puzzling question, however, I realize avoidance is
not the best way to deal with my conflict. It will keep coming back until I
find my fundamental stance in this time and space. So I decide to look into
the question carefully and find my inner voices to empower person-hood as
well as teacher-hood of my being. By starting with one of my life concepts,
Cheng (integrity), I will attempt to interpret the relationships between
knowing and doing.

My knowing and becoming a person
The Chinese character Cheng embraces the concepts that I have tried to
achieve in my living. This word consists of two parts: one part means word
and the other means completion; this character refers to “integrity”
altogether.
Living with this word, my life is a process of becoming a person who lives with integrity and in harmony with other beings in the world. My knowing should be completed in my doing. I complete my words and thoughts in my actions. This is the person that I need to become.

However, I find it difficult to accomplish this since I am only a weak and confused human being. My parents used to tell me that I should strive to become a person first rather than joining a profession. “You can be a good professional without any integrity but your life would be very confusing and trivial. You should work to become a good person first.” I didn’t realize how difficult it would be when I was little. I assumed I would become a person naturally as I grew up, however, the more I try to become a person, the further from me it seems. How can I cultivate this personhood in my living?

In *Ethical know-how*, Varela (1999) explains how we cope with the situations that we encounter in our everyday lives. He indicates we already know how to do things in everyday situations from the basis of recurrence. He calls our readiness-for-action *microidentity* and every specific lived situation *microworld*. Our microidentity responds properly to a microworld and we are consistently moving from one microidentity to another. For example, we already know how to use a spoon (microidentity) to eat soup (microworld) from our previous actions. We are experts in that situation. Varela points out, “In general, ‘who we are’—the pervasive mode of living—consists of *already* constituted ‘microworlds’ that have been founded throughout our lives” (p. 10).

However, we are also confronted with breakdowns that challenge our decision-making and behavioral patterns. During the breakdowns, our behavioral stance is selected or a microworld is brought forth to analyze its
appropriateness to the situation of the world. In this case, it can be questioned which stance or microworld is going to be chosen at the very site of breakdown.

Varela emphasizes the notion of ‘immediate coping’ during the breakdowns when we are not experts of our microworlds anymore. Immediate coping means we can cope with a situation at hand with appropriateness and immediacy. It is not a simple or reflexive task but a process that needs ‘the longest evolutionary time to develop’ (p. 18). How can I work to develop my immediate coping? How is immediate coping related to integrity in a good person? By citing Mencius’ argument on middle way and the harmony of intelligent awareness, Varela explains the meaning of immediate coping more clearly. He states, ‘the intelligent awareness…[as Mencius describes] takes a middle way…intelligence should guide our actions, but in harmony with the texture of the situation at hand’ (p. 31). Varela claims that ethical expertise knows how to respond appropriately and immediately to a situation at hand, which means immediate coping. Situatedness is a key factor in immediate coping. We encounter many different life situations that we haven’t experienced before. We immediately respond to the situation at hand in harmony and this appropriate immediate coping process is embodied in our microidentity (readiness-for-action) and then we become ethical experts of any microworlds and breakdowns in life situations.

To understand the relationship between harmony and immediate coping as a way of doing/living ethically and wisely, it is important for us to look into two main concepts of Confucianism: Li (禮) and Yi (義). These two concepts are intermingled in the concept of middle way/harmony, person making/becoming a person, and immediate coping/ethical expertise, therefore, it is necessary to explore these terms. Li[1] is about our outer actions while Yi[2] is about their internal signification or meanings. In Confucian theory, learning through ritual actions is very important to person making.

To manifest the relationships between Li and Yi, I’d like to provide a simple example of how a child learns the concept of ‘respect.” When a child doesn’t know the concept, ‘respect’ or ‘deference” to the elderly, the child starts by learning certain ritual actions, such as taking a bow, to learn respect. By repeating the action, one slowly learns the concept of ‘respect” and comes to know the appropriate situations in which to take a bow. Over time, the child internalizes the virtue of respect. When the child next sees elders, the child takes a bow out of respect and this is the moment when one’s ritual action matches one’s meaning, the moment of integrating Li and Yi. To understand this concept within a Western context, we can think about the example of ‘lining up” in a public place. Children learn to line up
(Li) from adults when they use public washrooms before they know that lining up is a way of keeping social convention for convenience or respecting others (Yi). They embody this ritual with its meaning and value later on and they always line up when washrooms are busy. There is no way to distinguish outer actions from inner meaning or vice versa when Li and Yi are intermingled and practiced in harmony. In this respect, actions take place with no time to engage intentions or consciousness because the intentions are actions and the actions become the situations that one faces. This is the moment when intelligent awareness is accomplished in harmony according to Mencius. Harmony or middle way is about one’s own self but also about the relationships between time and space. It is to reach harmony and middle way that is the moment of knowing achieved. An ‘exemplary person’ in Confucian theory and ethical expertise in Varela’s theory refers to the same person who has wisdom of harmony and integrity and always conducts themselves appropriately. Their actions are immediately performed in a situation at hand because they are themselves in their actions and ethical meanings. Confucius once said that becoming an authoritative person emerges out of oneself; how can it emerge out of others? (Hall & Ames, 1987)

Davis, Sumara & Luce-Kapler (2000) also point out, “consciousness is often too small to accommodate both engagement in an activity and awareness of one’s self or one’s actions. In fact, it is often reported that exemplary performances and profound engagements correspond to forgetting of self” (p. 7). In that regard, how can my actions respond to any situation righteously and immediately, if I am forgetting of self? How can I be an expert in immediate coping in my actions by finding harmony or middle way? How can my knowledge be integrated with my actions? What is knowing in this context? Knowing needs to embody meaning with rituals—that is, our body-learning needs to cope with a situation appropriately and with harmony. When rituals are internalized, meanings become integrated with ritual actions and, in turn, they become us.

Of course this process takes much time and effort. There are many obstacles involved in internalizing and integrating Li and Yi in our selves because all learning and knowing processes require patience and entail pain. So does the process of becoming a person. Therefore, to me the process of knowing is the same as my striving to become a person. I hope that my living will be with integrity and involve a harmony of knowing.

The gap between ‘what we know’ and ‘what we do” is a major challenge for all of us. It has been one of my biggest obstacles in becoming a person with integrity. In my mind, there are always struggles between awareness/responsibility and convenience/laziness. I must go through those struggles and sufferings to find a way to practice science and technology with awareness and responsibility, however, the process is sometimes very frustrating and unsatisfactory. I share my struggles and concerns with
others and grow accordingly in my confidence and motivation. We all face complex situations in our lives and try to reduce our suffering by admitting and caring about the problems. Only acceptance, not abjection, will help us to solve our problems.

Interlude

How is the integrity of my individual being related to my teaching profession? If I strive to become a good person with harmony, can my exertion be interpenetrated into my teacher-hood? What does it mean by teaching with integrity and harmony?

Realizing that students become disconnected from their science learning and recognizing the many complex and controversial issues in modern science and technology, my pedagogical concern has emerged in science education; we need to offer students opportunities to engage in dialogues of humanistic and mature uses of science and technology. Students as adults will need the capability and skills of decision-making and taking action in the context of science and technology in their future society. Humanity and wisdom need to be thoroughly dealt with in science learning. A lot of work needs to be done in this area; however, before I wait for the work to be completed by others, I shall try to start with what I can do in this situation where I am. As a way of living with harmony and integrity between my inner voice and outer action, I am unfolding my concerns of STSE education.

Science-Technology-Society-Environment (STSE) Education

STSE education attempts to connect science to students’ lives and to work toward a scientifically and technologically sound and sustainable society and environment. According to Common framework of science learning outcomes of Pan-Canadian Protocol (1997), scientific literacy needs to be developed in conjunction with an understanding of the “interrelationships” between science, technology, society and the environment. Many science educators stress the importance of STSE education to help students develop critical thinking and decision-making skills in order for them to become good citizens in a democratic society (Aikenhead, 1994; Bingle & Gaskell, 1994; DeBoer, 2000; Kirkham, 1989; Martin & Brouwer, 1991; Rubba & Wiesenmayer, 1991; Solomon, 1994).

Since the STSE approach was recognized in the late 1950s, its progress has been very slow and ineffective. There are many impediments to STSE education: lack of time, lack of resources, students’ differing socio-economic and cultural backgrounds, difficulties of evaluation, and so forth can all challenge teachers’ conduct of STSE education. I have, for example, seen many pre-service teachers’ lesson plans and teaching practices on STSE emphasised curriculum. Most of their lessons were very impressive and some of them reached deep levels of understanding of STSE issues. However, a few of the pre-service teachers mentioned that...
they felt uncomfortable teaching science with social and political issues because they were not familiar with the issues. The gap between teaching science at school and experiencing science in our everyday lives is still a big challenge for all of us.

The STSE approach requires value-laden and interdisciplinary strategies, which challenge teachers the most. It calls into play the idea that teaching should stimulate and penetrate students’ minds and in turn influence their decision-making processes and actions in their daily lives. This process of transformative teaching and learning makes STSE education very complex and important.

How do we transform our knowing into doing? How can we determine whether STSE education has been accomplished? That is, we surely cannot evaluate that students’ STSE knowledge has been internalized and in turn transformed into actions in their everyday lives. This is one of the fundamental questions that we face in teaching intrinsic values; however, this obstacle should not be the reason we stop promoting STSE education. STSE learning is an ongoing life process. It requires our positive and collective faith and patience. Only the future will prove our present education.

Under what circumstances can we say STSE knowledge is useful and effective? What if we have knowledge but the knowledge has nothing to do with our actions? How should education contribute to the elimination of the gap between knowing and doing? What is knowing? How can our knowledge be transformed into action?

STSE education is not limited to individuals’ knowledge development. It requires bodily actions in individuals’ decision-making and taking action. For example, if I know that using disposable cups is not a good idea for our environment, I will try not to use them as much as I normally would (since in the real-life context, it is impossible to refuse using them entirely). Even if I know that my knowing needs to correspond with my doing, I sometimes find it difficult to comply. My knowing is being challenged and practiced in situations at hand, causing me to question whether my action is realistic or self-justified at the moment. I struggle with the gaps between knowing and doing and I learn and grow through the struggles.

Knowing/learning is a transformative, endless process. It cannot be judged as a success or failure at one moment in time. There is no absolute, perfect, and certain end for knowledge. Knowledge is always reshaping its forms and breaking boundaries in the world that we are engaged in. It is constantly changing and transforming into another stage of knowing. It is always incomplete. Meanings also slip in the domain of discourse, where slippage and lack hover in the gap between the struggle to signify and the signified (Briton, 1997; Felman, 1987; Fink, 1995). We struggle with conventional signifiers to represent the signified. Knowledge is neither
mastered nor absolute. The process of knowing and learning can never stop as long as I experience the world with both body and mind as the world I am struggling to know and my own body-mind are in a state of perpetual trisection without end. So can it be possible to have complete knowledge at one point in time and space? I realize that as life goes on, my learning never stops.

So what counts as knowing and becoming a person in STSE contexts? Knowing and understanding STSE issues require “embodied actions.” When knowing is practiced in our body, our actions are natural, immediate and appropriate. We become experts at immediately coping in an appropriate manner. We need to make scientific and technological decisions based on humanity and ethics; this is appropriateness for sustainable development. Practitioners of STSE education should not be satisfied only by introducing or delivering conceptual knowledge. Such education has to cultivate its practice and embodiment as an analogy of ritual actions in our bodies. STSE education also needs to take into account learning through our everyday actions which will be internalized into our conceptual knowledge later on. When our inward understandings are transformed to outward actions and our bodily learning are internalized in the internal values of knowledge, I expect we will find the middle way in decision-making processes and embodied actions within the STSE context.

Closing
To live in integrity and harmony requires considerable self-discipline and patience. It sometimes requires me to give up my own interests or convenience. I find it very difficult to make an ethical decision in a situation where my habitual, economic and institutional pressures are deeply embedded in the decision-making process. The process is painful—a struggle, however, I exert to overcome with appropriateness and righteousness to fulfill cheng in my life, teaching and science education. I become disappointed when encountering my weaknesses and fragmented being in these struggles but I try to encourage myself, telling, “Be calm and patient. I am learning life to become a person.”

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References


Li is translated as rites, ceremony, decorum, manners, etc.; therefore, it is summed up as “ritual propriety.” Li refers to the general posture that one strikes and pursues as a person. Ritual actions and the body are interconnected and the body of the ritual actions can be described as the root that supports the innovation and creativity of cultural traditions.

Yi is righteousness or meaning. Yi is intrinsically intertwined with contexts in situations. Yi is a standard of one’s decision-making or conducts; therefore, it is fundamental to understanding the dynamics of person making (Hall & Ames, 1987).

STS and STSE can be used alternately in the same context. Recently, STSE is increasingly used to bring forth awareness of environmental issues. STSE education deals with multidimensional (interpersonal, social, economic, political and global) issues related to science and technology. It often engages ethical dilemmas. For instance, the topic of constructing dams needs to investigate scientific and technological knowledge (kinetic energy, electricity and so on) and the conflict between social and economic values and the destruction of natural habitats caused by dam construction. Recognizing the complexity of these issues altogether helps students to develop strong decision-making skills.

About the Author

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