RUNNING HEADER: What *Should* Be the Content for Student Learning?

What *Should* Be the Content for Student Learning?

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Abstract

Content in education is typically conceived as subject matter, often divided into disciplines such as mathematics, English, history, science, geography, and so forth. Content is often further conceived as being embedded in media such as textbooks, handouts, movies, computers, posters, and bulletin boards that are used in the context of classrooms inside school buildings. First, I discuss the difference between 'what is' and 'what should be'. The latter is a philosophical question, not an empirical one. I argue, as does Steiner, that content should support the primary educational goal to develop student *rationality*. Next, I discuss existing conceptions of content ('what is') and their limitations. As an alternative, I subsequently discuss Totally Integrated Education (TIE) as a way to facilitate the educational aim of guiding students to form strongly connected cognitive, conative, and affective mental structures that have been grounded through direct, first-hand, real-world experiences. Grounding of knowing, feeling, and intending is vitally important for development of strongly connected, holistic mental structures. Students with integrated mental structures that have been grounded and who are rational are less easily deceived and misled by others who are ignorant, prejudiced, or deceptive. If rational, we humans are free to seek truth and justice, instead of being misled by our false beliefs, emotions, and desires.

1. Introduction: What is? vs. What Should Be?

Instead of conceiving subject matter as acquiring knowledge within extant disciplines, I argue that educational content *should* be considered with respect to student mental structures that are expected to result from teaching and learning activities. This stands in stark contrast to "covering the content" presented in printed textbooks and other media, which is too often the case in schools today.

It is a mistake to justify 'what should be' on the basis of 'what is'. To do so would be to commit what philosophers call the 'naturalistic fallacy' (Stanford Encyclopedia of Philosophy, 2004). Just because something exists does not mean it is good. For example, murder of human beings still occurs. Murder exists, but that does not mean we *should* do it or allow murders to continue. As another example, in American schools, student achievement has been measured by standardized tests in recent decades, and those tests, in turn, tend to drive what content is taught in K-12 education. But that does not mean that we *should* assess student learning achievement by such tests. Just because something exists does not mean it *should* exist.

Scientific and praxiological inquiry are *empirical* matters. For example, we know scientifically that a very large amount of energy is released when mass is destroyed. And some engineers praxiologically know how to make atomic bombs of great destructive power. But that does not imply that we *should* make and use atomic bombs.

"What should we do?" is a philosophical question. It is not an empirical question about what is or what works. Empirical data are not required to answer a philosophical question. Philosophy is concerned with matters of value, with matters of what is worthwhile.

"What is intrinsically worthwhile?" is not an empirical question. Empirical data are irrelevant.

If we are going to determine worthwhileness, we must have justifiable criteria for making such judgments. Reasoned argument is paramount for such justification. Rationality is required.

Reasoned argument for criteria should not be based on what is, but rather on what ought to be. Reasoned argument for justifying criteria should not rely solely on empirical evidence, for to do so would be to commit the naturalistic fallacy.

The ultimate criteria for making such judgments must be based on initial principles that are justified by means other than empirical evidence. As an example, the Greek philosopher, Plato (360 B.C.), put forth the fundamental principles of *truth*, *goodness*, and *beauty*.

Another well-known philosopher, Immanuel Kant, reasoned that justice should be determined by the *categorical imperative*: "Act as though the maxim of your action were to become, through your will, a universal law of nature" (1785, p. 24). In other words, it is right for one person to do this action, only if it also should become a universal law for everyone to do so. For example, one should treat others with respect, because everyone ought to do so. On the other hand, murder of human beings cannot be justified, when judged rationally by the categorical imperative.

Elizabeth Steiner (2009), an authoritative educational philosopher, further argued for these primary criteria: "The justification of the principles of universality (*impartiality*), autonomy (*liberty*), and humanity (*rational benevolence*) resides in the intuition of rationality as the essential characteristic of humanness" (Section 13.5, italics added). Simply put, to be truly free, we must become *rational*. The primary goal of education should be to guide students to become rational and therefore free (Steiner, 1981).

In summary, justification of criteria for determining educational content must be through reasoned argument from initial principles—i.e., through rationality—not from empirical fact. What is does not justify what ought to be.

2. What Exists: Content as Cognitive Subject Matter Divorced from Emotion and Intention

The great American philosopher of education, John Dewey (1916) discussed the typical conception of content as subject matter:

> In the traditional schemes of education, subject matter means so much material to be studied. Various branches of study represent so many independent branches, each having its principles of arrangement complete within itself. History is one such group of facts; algebra another; geography another; and so on till we have run through the entire curriculum. (p. 134)

Not much has changed in the century that has passed. For example, in the U.S. the Common Core State Standards have been widely promoted and adopted. According to their promotional website, these Core Standards have been adopted by 41 U.S. states, as of October, 2018: http://www.corestandards.org/standards-in-your-state/ .

Readers should note that the Common Core State Standards largely address *cognitive* outcomes in mathematics and English language arts in grades K-12. *Conative* and *affective* goals appear to be missing from the Common Core State Standards, nor are these important goals assessed by standardized tests. This is particularly salient in light of findings about prevalent student feelings about school. For example, the majority of U.S. high school students are bored every day in school. Yazzie-Mintz (2007) summarizes results from a survey of 81,499 students in 110 high schools across 26 U.S. states. Approximately 2 out of 3 students said that they were bored in class every day. When asked why they were bored, the top reasons were that learning materials were uninteresting, irrelevant and not challenging enough. Yazzie-Mintz cited one student who stated, "Our school needs to be more challenging. Students fall asleep because the classes aren't really that interesting." Another said, "School is easy. But too boring. Harder work or more is not the answer though. More interesting work would be nice" (p. 10). Students who considered dropping out of school indicated that the main reasons are dislike of their school and teachers. Sixty percent further said, "I didn't see the value in the work I am asked to do" (Yazzie-Mintz, 2007, p. 5). For those who stay in school, the primary reason they do so is to get their high school diploma, so that they can go on to college.

The lack of integration of cognitive, conative and affective outcomes does not bode well in terms of student learning. Greenspan and Benderly (1997) have noted that since the ancient Greek philosophers, the cognitive aspect of mind has often been viewed as developing separately from emotion. They argue that this view has blinded us to the role of emotion in how we organize what we have learned: "In fact, emotions, not cognitive stimulation, serve as the mind's primary architect" (p. 1). They identify the importance of emotion during human experience: "… each sensation … also gives rise to an affect or emotion…. It is this dual coding of experience that is the key to understanding how emotions organize intellectual capacities …" (p. 18). Greenspan and Shanker (2004) provide further evidence of how emotion is central to how we organize our thinking.

There is a biological basis for formation of mental structures (i.e., learning) as they are encoded through neural connections in the nervous system (Kandel, 1989; 2001; Squire & Kandel, 1999). Kandel (1989), a Nobel-prize winning neuroscientist, concludes from empirical evidence that:

> Learning produces changes in neuronal architecture (p. 103)…. Whereas short-term memory does not require the synthesis of new proteins … the consolidation of long-term memory … does require new protein synthesis (p. 109)…. Our evidence suggests that learning produces enduring changes in the structure and function of synapses... (p. 121)

Kandel recommends further study on the "… the *power of experience* in modifying brain function by altering synaptic strength…" (p. 123, italics added). Subsequent research in neuroscience has further supported Kandel's earlier claims (Eagleman, 2015).

If emotion is indeed the architect of mental structures, as mounting evidence appears to support (Eagleman, 2015; Greenspan & Shanker, 2004), then it follows that many students are likely to be developing ill-formed mental schema for the subject matter they are expected to learn in school—mental structures which are weakened or disconnected from existing mental structures due to feelings of meaninglessness, irrelevance, boredom and even disdain with respect to the content of their education (Frick, 2018). Ideally, students should instead be developing mental structures that are strengthened through authentic life experience and positive emotion. If so, then those positive feelings and the authenticity of purposeful learning activities will facilitate organization of mental structures that constitute long-term memory.

Students could attain the Common Core Standards while remaining unenthusiastic towards learning itself, and fail to be inspired and to persevere in discovering lifetime pursuits. That is, students could perform well on standardized achievement tests, but not be able to answer the important question: What should I do with my life?

3. What Should Be: How Do We Guide Students to Be Rational?

If we value the criteria of *impartiality*, *liberty*, and *benevolence* (cf., Steiner, 1981, 2009), then the content of education should focus on the development of student *rationality*. Being rational is facilitated by the integration of cognition, emotion, and intention through activity that is grounded. Cognition refers to thinking, emotion to feeling, and intention to trying. Activity that is grounded means that student experience of objects of learning is direct—that is, first-hand experience. For example, looking at a drawing of a dog is second-hand and indirect, not grounded in the sense of actually interacting with a dog—e.g., actually seeing it, hearing it bark, petting it, smelling it, playing with it, getting licked by it, etc.

As an example of non-integration, we could reason cognitively that every person should be treated with respect—based on Kant's (1875) categorical imperative. However, if in actuality we also feel hatred and fear toward others whose skin color is different, and we exclude them from our community, then we would be irrational. Our cognition would be dissociated with our feelings and our actions. We would in fact be racists. We would be irrational. We would believe and say that everyone should be treated with respect, but our feelings and actions would contradict our cognition.

What is needed is Totally Integrated Education. TIE is intended to help students form mental structures which integrate cognition, intention, and emotion through grounded real-world experiences. Figs. 1, 2, 3 and 4 represent cognitive, conative, and affective levels to be integrated when designing content for student learning.

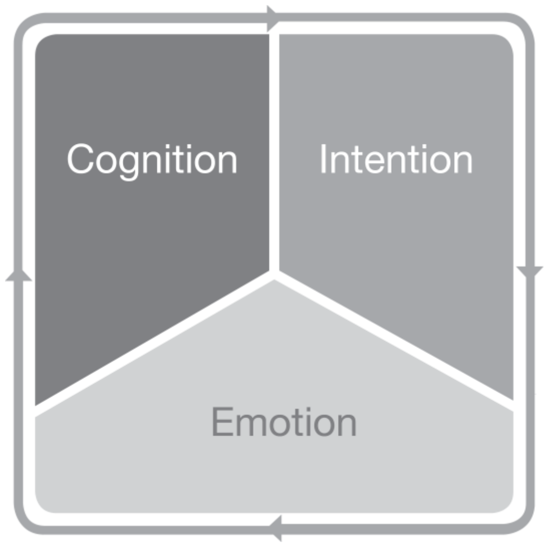

Figure 1. Schema for desired connections among a student's cognition (thinking), intention (willing), and emotion (feeling) during a learning activity (graphic by Colin Gray). Reprinted with permission from Frick, 2018.

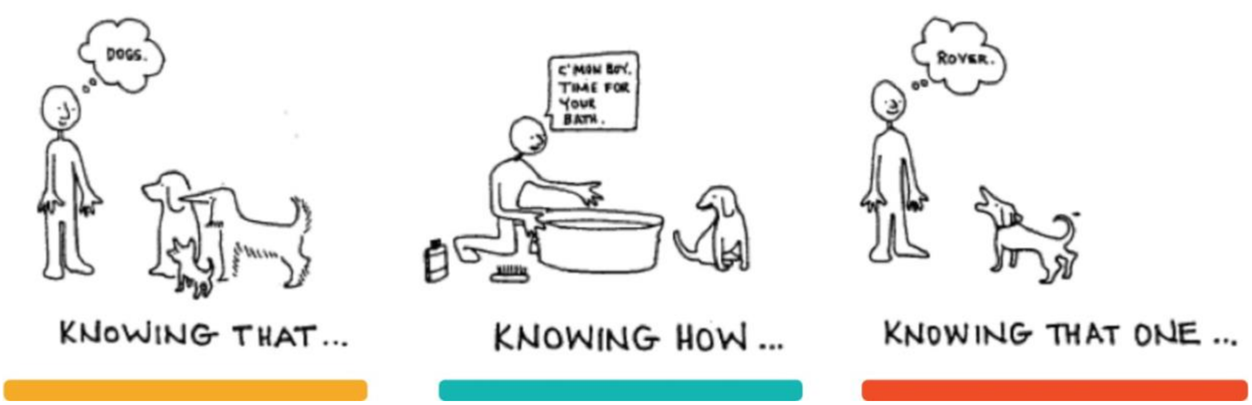

Figure 2. Three basic kinds of cognition (drawings by Elizabeth Boling). Reprinted with permission from Frick, 2018.

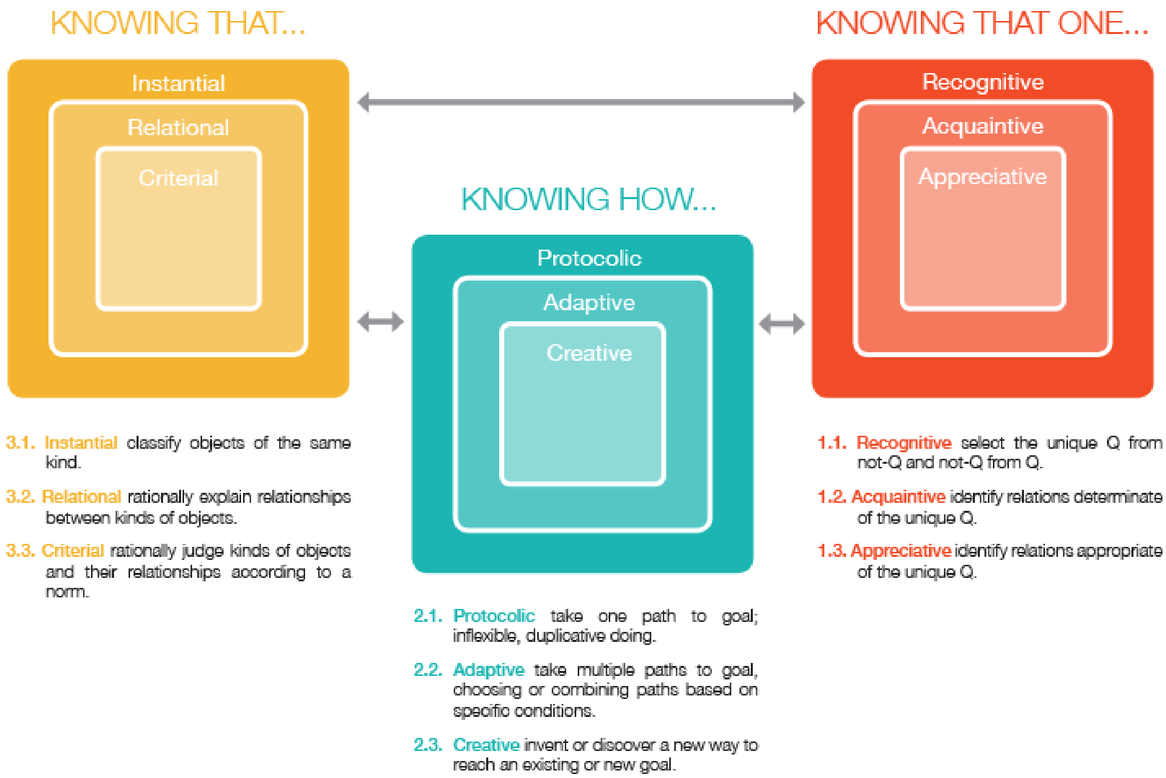

Figure 3. Illustration of integration of 9 kinds of cognition. The shading of areas indicates presence of components, and the nesting of areas represents subset relationships (connectivity). The double-headed gray arrows represent connections among the 3 basic kinds of knowing, which are respectively color coded. Graphic by Colin Gray and Theodore Frick. Reprinted with permission from Frick, 2018.

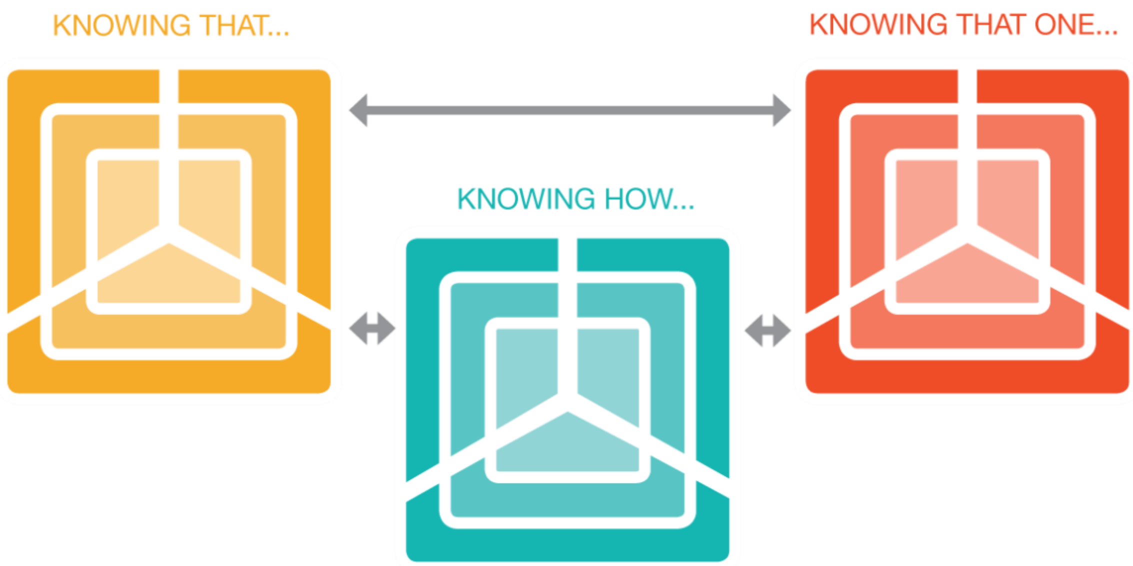

Figure 4. Illustration of a totally integrated mental structure, where cognition, intention and emotion are completely connected with respect to an object of knowing (e.g., a dog). Figures 1-3 are in essence combined visually. Graphic by Colin Gray and Theodore Frick. Reprinted with permission from Frick, 2018.

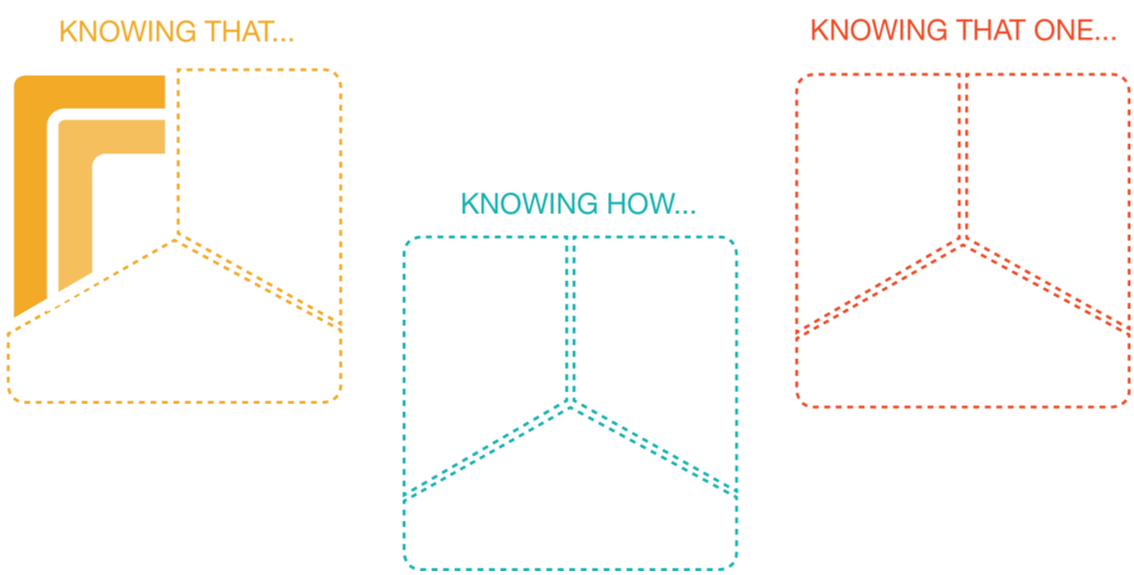

Figure 5. Illustration of a weak and highly disconnected mental structure. Components are mostly missing and disconnected with respect to a given object of knowing (e.g., a dog). Unshaded areas with dashed borders indicate those components are missing. Moreover, the three basic kinds of knowing are disconnected, represented by *lack* of gray arrows. Compare with Fig. 4. Graphic by Colin Gray, reprinted with permission from Frick, 2018.

Note that in Fig. 5, 18 components of 'knowing how' and 'knowing that one' are missing, disconnected from each other and from 'knowing that'. Furthermore, *within* 'knowing that', 6 components of student intention and emotion are missing from this mental structure (with respect to an object of knowing), which are represented by unshaded areas with dashed borders. The only two present and connected components in Fig. 5 are instantial and relational 'knowing that' with respect to an object of knowing (e.g., a dog). Criterial 'knowing that' is absent and hence disconnected. This kind of ungrounded and dissociated learning can occur when signs used in communication are used in isolation from their corresponding real-world objects and purposeful activity. The resulting mental structures are weakly connected, lacking wholeness and integration.

Figs. 3, 4 and 5 are grossly oversimplified representations of mental structures in the human nervous system, which is extremely complex. Even fMRI movies of firing synapses in highly complex neural circuits in real time are very rough approximations to the complexity of *active* connectivity. fMRI movies do not indicate the bio-chemical *potentials* of trillions of connections among billions of nerve cells that are not firing at any given time (cf. Kandel, 1989, 2001; Eagleman, 2015). According to Greenspan and Shanker (2004), strength of feeling (emotion) during a human activity affects the strength of the bio-chemical *potential* of each connection (the enduring structure). The actual firing of a connection in real time is part of the thinking process (Eagleman, 2015). Connected intentionality appears to be associated with neurotransmitter activity and structural receptors in a part of the brain that is associated with motivation (cf., Lustig, 2017). Note that TIE is an *educational* theory (Frick, 2018), but it nonetheless appears to be consistent with emerging research in neuroscience and how people learn (National Academies of Sciences, Engineering, and Medicine, 2018); and neuroscience is a relatively young field (Eagleman, 2015; Lustig, 2017).

Note further in Fig. 2 that three fundamental types of cognition are identified: 1) 'knowing that', 2) 'knowing how', and 3) 'knowing that one' (Brown, 1972; Estep, 2003, 2006; Frick, 1997; Geach, 1964; Maccia, 1973, 1987, 1988; Ryle, 1959; Sheffler, 1965). Clearly, these three classifications of cognition are *not exclusive* in the sense that two or more of them can occur at the same time within an individual. For example, in Fig. 2, the person knows Rover as an instance of the dog classification ('knowing that'), a way to give Rover a bath ('knowing how'), and this particular unique dog, Rover ('knowing that one').

In Fig. 3, kinds of knowing are further explicated, based on Maccia's pedagogical epistemology, Estep's (2003, 2006) evidential arguments about natural intelligence, and Frick's (1997) discussion of issues in artificial intelligence. Nine kinds of knowing are outlined below as goals for worthwhile education—i.e., cognitive structures that students *ought to* develop:

1. **'Knowing that'**: what are indicators of '*belief*'—is it warranted by disciplined inquiry, i.e., is it *true* belief?
    1.1. *Instantial*: classification of objects of the same kind.
    1.2. *Relational*: rational explanation of relationships between kinds of objects.
    1.3. *Criterial*: rational judgment of kinds of objects and their relations according to a norm.

2. **‘Knowing how’**: what are indicators of *‘performance’*—is it effective and ethical?
    2.1. *Protocolic*: take one path to goal; inflexible, duplicative doing.
    2.2. *Adaptive*: take alternative paths to goal, choosing or combining paths based on specific conditions.
    2.3. *Creative*: innovate or invent a new way to reach an existing or new goal.
3. **‘Knowing that one’**: what are indicators of ‘*opinion*’—is it right?
    3.1. *Recognitive*: select the unique Q from not-Q and not-Q from Q (where Q is the object of knowing)
    3.2. *Acquaintive*: identify relations determinate of the unique Q.
    3.3. *Appreciative*: identify relations appropriate of the unique Q.

Norms for evaluating these kinds of knowing are indicated by the questions following each of the three major types. In worthwhile education, when students develop mental structures for ‘knowing that’, their beliefs must be *warranted by disciplined inquiry*. In other words, students should come to hold *true* beliefs. For ‘knowing how’, student conduct must be both *effective* and *ethical*. For ‘knowing that one’, *right opinion* is essential. Clearly, some learned beliefs are unwarranted, some actions are unethical, and some opinions are not right.

Unfortunately, students can develop mental structures for false beliefs, bad actions, and wrong opinions. One can, for example, believe that the earth is the center of the universe; however, Galileo and Copernicus long ago provided empirical evidence that this belief is false. It is not supported by facts. One can hold the false belief that plain water freezes at 100 degrees centigrade. Such belief is clearly at odds with empirical evidence. One can learn how to deceive others, by making emotional appeals to their fears and prejudices. Such conduct is unethical.

Note that within each type of knowing, each higher level requires the lower level. Criterial knowing requires relational knowing, and relational knowing requires instantial knowing. Creative 'know how' requires adaptive 'know how' that, in turn, requires protocolic 'know how'. Appreciation requires acquaintance, and acquaintance requires recognition. In other words, within each classification of knowing, the categories are progressively inclusive.

Maccia's typology for cognitive structures is further used here as parallels for classifying conative and affective structures:

Universals

A universal is a "form or essence" that is not limited by time and space (Steiner, 1988, p. 5). For example, 'justice' is a universal. A student can learn to seek justice as a goal. This would be a conative structure. That student could also develop affective mental structures for good feelings about justice, and bad feelings about injustice.

Means to ends

There are 'means to ends', i.e., ways of doing. For example, the Macintosh operating system is a means to launch apps, print documents, do text messaging, etc. One might want to use the Mac OS, time and time again. This would be a conative mental structure. One might also have good feelings toward use of the Mac OS. Hence, there may be conative and affective structures for means to ends.

Uniques

Conative structures can have unique objects, just as cognitive thoughts and means to ends. For example, a person can want a particular thing, such as MacBook computer, or to be friends with a unique person such as David Merrill, the author of *First Principles of Instruction* (2012). Similarly, one can have feelings towards that MacBook or David Merrill.

Finally, note that in Fig. 4, total integration of cognition, emotion, and conation is illustrated. For example, cognitive understanding of 'truth' as a universal is an example of 'knowing that'. Justifying the value of truth as a norm and applying truth as a criterion in judging assertions is an example of *criterial* 'knowing that'. Seeking of truth is conative, and feeling strongly resolute about truth is affective. To 'know how' to determine truth is cognitive—i.e., how to do disciplined inquiry to create knowledge. To intend to find the truth about a matter is conative. And the satisfaction of establishing truth is affective. To 'know that one' truth is cognitive—e.g., to know that former U.S. President Thomas Jefferson owned slaves at his residence at Monticello is acquaintive 'knowing that one'. To feel revulsion about this particular fact about Jefferson is affective, even though he is well-known and appreciated for being instrumental in writing the U.S. Declaration of Independence.

Next, I further illustrate TIE through several extant cases in education.

4. Examples of Totally Integrated Education (TIE)

Frick (2018) described two extant cases which illustrate TIE. Three more cases are described here, the: Unionville Elementary School EARTH curriculum; State University of

New York (SUNY) Cobleskill Fisheries, Wildlife and Environmental Sciences program; SUNY Cobleskill Biotechnology program.

5.1 Unionville Elementary School Curriculum

The Unionville Elementary School in Bloomington, Indiana, USA, has developed a unique curriculum they identify by the acronym EARTH: Environment, Art, Resources, Technology and Health. Howell (2018) notes:

> You can see it when you stop by the school: Trays full of seedlings sprouting on classroom windowsills. Potatoes growing roots in cups of water. Large shelves bearing gardening tools and seed packets near the back door. Teachers and students holding class outside, on the hill, by the garden boxes, under the sheltered "learning lab" on the playground and in the miniature amphitheater with wooden benches by the pond. Students planting flowers and vegetables, or watching and sketching the trees, writing their observations in science notebooks. (paragraph 2)

Howell further writes:

> In many ways, the curriculum harnesses things Unionville has been doing for years. They compost and recycle in the school cafeteria, use the outdoor spaces often and go for hikes on Unionville's 18 acres. The fishing club catches fish in the school's pond from a little dock built for class purposes. They use different kinds of art, including quilting, to visually represent what they're learning. The school teaches digital citizenship and coding, as well as healthy living and good lifestyle choices.

> EARTH puts a renewed focus on those elements, increases the number of science experiences and puts an outdoor, environmental twist on it all. (paragraphs 7-8)

Howell quotes the Unionville principal, Lily Albright, who said, "It's about appreciating and understanding what's going on right here in our own backyard, and applying that as we think about the world and our place in the world" (Howell, 2018, paragraph 9).

The EARTH curriculum is clearly intended to help guide Unionville elementary students to connect 'knowing that', 'knowing how', and 'knowing that one' (see Figs. 1, 2, 3 and 4). It illustrates a practical implementation of TIE in this particular context.

5.2 SUNY Cobleskill Fisheries, Wildlife and Environmental Sciences Program

Hands-on learning is central for students in the Fisheries, Wildlife and Environmental Sciences program at the State University of New York, in Cobleskill, NY, USA. The program utilizes its own cold-water fish hatchery tanks (Fig. 6). One classroom includes aquariums with live fish as well as some taxidermized species on the walls (Fig. 7). Advanced undergraduate students spend time in the outdoors doing scientific research, and subsequently present their findings at professional conferences (Fig. 8).

Feldman (2018) quotes department chair, Mark Cornwell, who says:

> As students progress in the program, moving up level to level, the mix of their activities changes… For example, those at the beginning of their study are taught in four-hour blocks of time. The first hour is classroom instruction covering theory and practice; the remaining three hours are spent in the water, where students are suddenly surrounded by what they were just taught about in class. It's a terrific way to teach and learn." (p. 7)

Figure 6. Department chair, Mark Cornwell, explains that large fish tanks on campus are used for breeding purposes. Students learn how such hatcheries are managed, engage in raising fish, and then release them into the wild in upstate New York. Photo by T. Frick.

Figure 7. A classroom at SUNY Cobleskill includes both live and mounted species of fish. Photo by T. Frick.

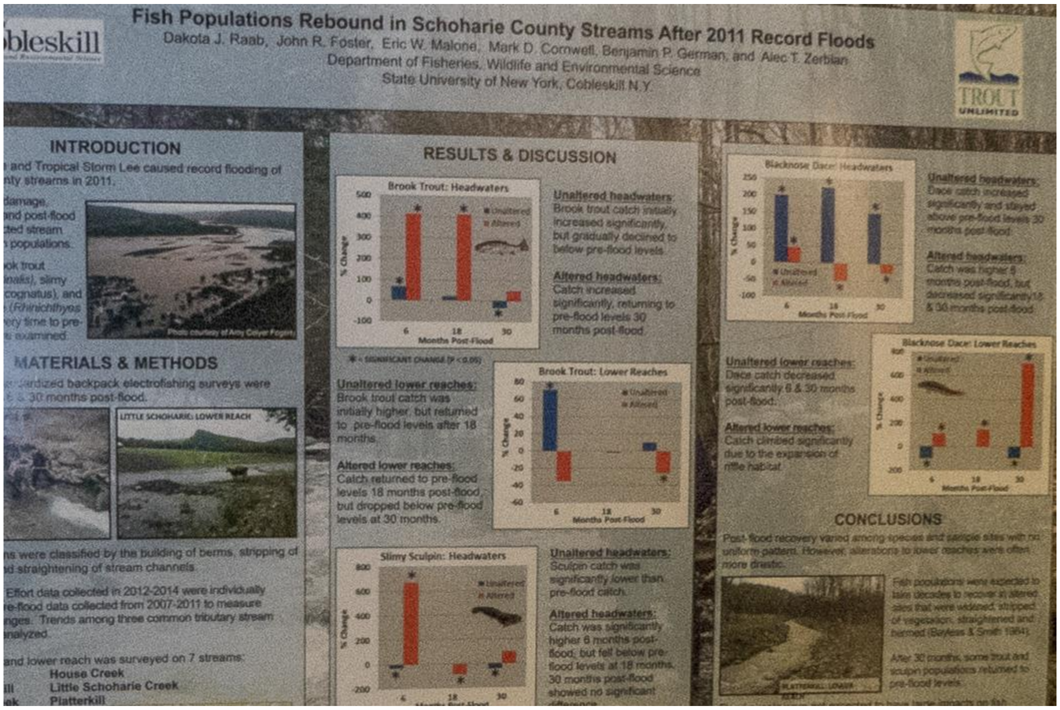

Figure 8. Posters such as this one are presented by undergraduate students at professional research conferences. Photo by T. Frick.

Feldman (2018) further describes this unique program:

> As they continue in the program, students collect and interpret data, delve deeply into the biology of the species with which they work, even become conversant about the laws and regulations that affect the present and future of specific habitats and of the environment in general. (p. 7)

Cornwell is further quoted: "Ultimately, our goal is to produce graduates who are both extremely knowledgeable about the real-world species and systems they study and the relevant public policy issues that arise in our field" (Feldman, 2018, p. 7).

It is clear that students in this undergraduate degree program at SUNY Cobleskill are provided with learning activities and contexts to help them connect 'knowing that', 'knowing how', and 'knowing that one'. Parts of the real world are brought to the campus learning environment, and students also go out into the real world as they continue learning. This is an excellent example of totally integrated education (TIE), as illustrated in Fig. 4. Contrast these SUNY learning environments with typical barren classrooms where students read textbooks, perhaps watch some videos, sit at desks discussing ideas during class, and subsequently take paper-and-pencil tests on what they have learned (schematized in Fig. 5).

5.3 SUNY Cobleskill Biotechnology Program

Undergraduate students from the SUNY Biotechnology program are actively recruited by graduate schools and corporations. Feldman (2018) describes the intensive, hands-on program, where juniors and seniors "do valuable leading-edge research in such areas as developing disease and drought-resistant crops for agricultural enhancement" (p. 8).

Student research involves genetics, and some of them are invited to present at professional conferences. Students not only must understand genetic theory (relational 'knowing that'), but engage in creative 'knowing-how' (Fig. 4) as they develop new strains of plants. Student learning appears to be purposeful (conative) and satisfying (affective). Feldman quotes biotechnology professor, Peiyu Zeng:

> Our program definitely makes its mark among other researchers working in our field… For instance, SUNY Cobleskill is one of only a handful of academic institutions that have been able to create a strain of soybeans capable of withstanding highly adverse growing conditions. It is wonderful for students to know that the work they do here will have a real impact—and real visibility—in the world outside our labs. (p. 8)

The SUNY biotechnology program is a further example of totally integrated education in higher education. TIE is a theory that can be actualized in practice. As defined in educology, *content* is conceived as "objects and signs of objects selected for student learning" (Educology, 2018, http://educology.indiana.edu/content.html). As C. S. Peirce (1932) noted:

> The Sign can only represent the Object and tell about it. It cannot furnish acquaintance with or recognition of that Object; for that is what is meant … namely, *that with which it presupposes an acquaintance in order to convey some further information concerning it* (2:231, italics added).

Context is defined in educology as "the system environment for teaching and learning that includes content" (http://educology.indiana.edu/context.html). Clearly, teachers at Unionville Elementary School and at SUNY Cobleskill utilize content and contexts beyond the confines of classroom walls and signs (words and pictures) contained in books and other media. These students are provided with opportunities to experience particular, unique objects in their immediate learning environments with which respective signs are directly associated ('knowing that one'). These learning activities can help students to connect cognition with emotion and intention (Figs. 1, 2, 3, and 4). Through hands-on learning activities, they can form holistic, integrated mental structures that are grounded in real-world experiences.

5. Summary and Conclusion

Content as typically conceived is the subject matter of education, often contained in textbooks, movies, posters, and more recently within software apps run by computers, tablets, and smartphones. This chapter has, hopefully, dispelled this limited conception of content. My arguments for a much broader conception of content are largely based on those made by Dewey, Steiner, and Maccia (see the Educology Website: http://educology.indiana.edu/). I have further alluded to *conative* and *affective* schemata for student learning as Steiner (1988) described. Conative and affective mental structures are also important parts of content for student learning. Totally Integrated Education aims to help students connect cognitive, conative, and affective structures through learning activities that support holistic integration of these structures (Figs. 1, 2, 3, and 4). The Unionville Elementary School was used as an exemplary case, as well as two undergraduate programs in the sciences at SUNY Cobleskill.

If we pursue totally integrated education (TIE), *student learning will be grounded*. Grounding of knowing, feeling, and intending is vitally important. Students who are grounded are less easily deceived and misled by others who are ignorant, prejudiced, or who intentionally lie or distort truth. Students who can think critically become responsible participants in a democratic society. Critical thinkers will not allow deceitful leaders, tyrants, shysters, or ignorant people to control us and tell us what to believe, feel, or to do. The principles of *impartiality*, *liberty*, and *benevolence* justify the need for development of student *rationality* as the primary aim of education (Steiner, 1981; 2009).

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