Religion and Technology

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Abstract

Technology in all its varied manifestations and religion throughout its many traditions and expressions exhibit a long and complex interrelationship from prehistoric times to the present. Continuously evolving formal systems of religious thought and more informal daily practices among the religions of the world present a wide array of issues, understandings, attitudes, and values toward technology as well as demonstrate the complex influences that varied technologies have exerted directly or indirectly on the religious impulse. Technology and design education needs to explicitly engage religious thought and praxis as it relates to the technology curriculum for the sake of learners and for the future of society.

Keywords

Buddhism • Christianity • Design • Education • Folk religion • Hinduism • Islam • Judaism • Religion • Shintoism • Sikhism • Taoism • Technology

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Why Religion and Technology?

It might at first glance seem quite odd that an international handbook on technology education would have a chapter coupling religion and technology. Academics and others might be excused for thinking that there are few explicit relationships to be found between religion and technology, and those that do exist primarily are unidirectional. After all many influences in the late twentieth and twenty-first centuries seem to run in the direction of technology inexorably asserting its influence and power over the realm of religion and spirituality just as it has seemingly done across commerce and economies, institutions (cultural, educational, social), social life, politics, sports, and other realms of human endeavors and activities. But if by *technology* we mean the human activities that seek to meet human needs and human wants by taking materials of various kinds and imaginatively and creatively combining, reconstituting, reconfiguring, and engaging in myriad other transformations to produce the ever-evolving, human-designed environments that we inhabit for most of our lives, we may immediately perceive some ways in which religion, the technological world, and the goals, skills, and methods associated with technological design, making, and evaluating are inescapably and continually interacting.

Consider the following excerpts from the English national curriculum in design and technology for Key Stages 1, 2, and 3 (Department of Education 2013a, b):

- Overall the national design and technology curriculum requires that students ". . . work in a range of relevant contexts," and includes the non-mandatory examples of "home, school, leisure, culture, enterprise, industry, and the wider environment." Industrial contexts at Key Stage 3 include " . . . construction, food, agriculture (including horticulture) and fashion."
- Key Stage 2 requires students to engage in design that includes seeking to determine " . . . fit for purpose, aimed at particular individuals or groups" and active making of things that among other aspects "uses a wide range of materials and components . . . according to their functional properties and aesthetic qualities."
- Key Stages 1, 2, and 3 recognize the importance of cooking and nutrition as a mandatory component at all three levels, noting that "learning how to cook is a crucial life skill."
- Key Stage 3 requires students to design in ways that "use research or exploration, such as the study of different cultures, to identify and understand user needs." It also requires that students learn how to skillfully evaluate technological designs, processes, and systems including the ability to "analyse the work of past and present professionals and others to develop and broaden their understanding,"

"test, evaluate and refine . . . taking into account the views of intended users and other interested groups," and to "understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers, and technologists."

It should be clear to even a casual observer that learning requirements like these unavoidably engage aesthetics, values, needs, desires, and uses related to technology on the part of teachers, students, and wider communities that both invoke and involve religious traditions, religious practices, and specific groups within society whose primary identification is with one or more particular religions which embrace, for example, dietary requirements, particular aesthetics for attire, sensibilities about human beings and other creatures (both the large and very small), and teachings viewed by adherents as integral to how they engage the wider world and values that likely will profoundly influence their own future inputs into that wider world.

Religion as an Important Sphere of Human Activity

Religion, like the word "technology," has proven difficult to define in a manner that commands universal assent and fits the variegated landscape of academics and practitioners around the globe. One reasonable working definition posits that "a religion is a unified system of beliefs and practices about life and the world relative to the supernatural that unite the believers or followers into a social organization or a moral community" (Yang 2011: 36). As Yang noted in his Presidential Address to the Society for the Scientific Study of Religion on October 24, 2015, "this definition includes four essential elements of a religion: (1) a belief in the supernatural; (2) a set of beliefs regarding life and the world; (3) a set of ritual practices manifesting the beliefs; and (4) a distinct social organization or moral community of the believers and practitioners." (Yang 2016: 15).

Secularists since the dawn of literate societies have predicted the utter demise of organized religions of all types in the face of what is envisioned as the inevitable progress of science and technology as it deconstructs, reconceptualizes, and commodifies the world. Demographic data from over 2,500 censuses, surveys, and official population registers were collected and analyzed to determine the current state of the world's religions by the Global Futures Project of the Pew Research Center's Forum on Religion and Public Life in 2010. The resultant final report issued in 2012 (Pew Research Center 2012) documents that 84% of the world's people identify with one or more particular religions. About 32% identify with various forms of Christianity, 23% with Islam in its varied manifestations, 15% with various branches of Hinduism, 7% with various Buddhist movements, 6% with different folk religions, 0.2% with forms of Judaism, and 0.8% with other religions such as Jainism, Sikhism, Baha'i, Shintoism, Taoism, Tenrikyo, Wicca, or Zoroastrianism. Only 16% of the world's current population fails to identify with a particular religion. Even within this category of no current affiliation, the report notes that the majority of these people describe themselves as, for example, believing in God or

a universal spirit, or articulate other beliefs that would be characterized as religious or spiritual ideas, despite not identifying with any particular religion.

Such massive evidence of identification with religion does not mean that the affiliate in question routinely participates in the formal expressions of these various religions in a public manner or that they are necessarily knowledgeable or at all an active practitioner of their religion. In terms of nominal identification and affiliation, however, these recent findings have changed relatively little since social scientists have been measuring such matters, despite overt identification with a distinct religion declining by single digits since measurements began. Even here, the data demonstrates that the rate of what might be termed "unbelief" in any religion's precepts has held virtually steady throughout the twentieth and early twenty-first centuries.

This data-rich contemporary understanding by scholars is consistent with how historians and religious scholars have documented the widespread followings and impact that various religions have evidenced in the past. People switch religions, move in and out of active practice, articulate beliefs at times highly variant within the distinct religion with which they identify (at least according to widely recognized religious scholars and theologians of that particular religion), and engage in overt behaviors sometimes completely opposite to what is advocated as normal and even required for fidelity to that tradition by leading spokespersons (both dispassionate scholars and leading practitioners) within that religion past and present. Nevertheless, the power of religion remains as one clear and persistent marker of human self-identification despite the most rapid scientific and technology changes the world has ever witnessed. Its very pervasiveness within human societies suggests that technology and design educators must make more effective connections between the religious ideas and orientations active within the lives and minds of learners and the technology and design curriculum – especially with its contemporary focus on design for varied users and purposes, values and technology, and the wider importance of culture and society as they both influence and are influenced by technology and technology education.

Religion and the Realm of Technology

Religions in general, especially those thought of as *major* world religions due to their number of adherents, are characterized by a narrative and philosophical orientation that seeks to bring all of life under the explanatory power and influence of the religion in question. For religious people in large part since prehistoric times, nature itself is the forum through which the mysterious aspects, attributes, and desires of a higher, unseen world are mediated through "signs and symbols." These signs and symbols could include the surface of the Earth itself, things underneath the surface or that emanate from it, objects that fall from the sky, perceptions from the human senses, and thoughts and dreams within the mind – including "communion" with one or more other realms that are mediated through language (an ability that is not

infrequently itself seen to also be a gift from this unseen, mysterious realm). In this sense, nature serves as the bridge between our world and world(s) that do or might exist outside of our own realm of existence. Even religions that seem to be very other-world centered are taking up that positioning via the physical reality within which they currently reside and which they value for what it reveals to them about that which lies beyond their ken (Bellah 2011).

The three influential monotheistic religions of Judaism, Christianity, and Islam that share some common religious texts and outlooks have traditionally held the view that there is a distinct separation between the Earth and the physical universe within which it dwells and God. God himself needs no physicality to exist and dwells outside time "within" the realm of eternity. At the same time, God brings into existence the world and has an intimate relationship with the created order, including the human beings that inhabit that order – yet the visible universe neither encapsulates or fully expresses the divine being nor subsumes the created order into the divine being. Creator and creation are intertwined just as an artist or craftsman has a relationship with their work products – a view that has also been expressed by some twentieth-century scholars such as Aurobindo Ghose within Hinduism, another scripturally based religion (Ward 1996). One of the stories from the book of *Genesis* (Chap. 2) in the Hebrew Torah that all three religions share and interpret as part of their traditions relates the creation of human beings, the bestowing of names on various creatures which are "brought to '$\bar{a}\underline{d}\bar{a}m$'" by God, and the human couple cultivating the garden of "Eden." Chapter 3 of *Genesis* describes how this gardening duo are tempted by the serpent and in violation of God's command seek to know as God knows and become his coequals. Following this "fall" from divine favor, the ground is cursed, the created order is affected, and humans are forced to leave idyllic Eden. The subsequent descendents of Cain are identified as the builders of cities and progenitors of technical arts and crafts among the Hebrew people (Genesis 4: 17–22).

To varying degrees in all four of these scriptural religious traditions, there is a strong thread of explicit commentary and teaching about the need for practitioners, in partnership with God, to remake the world, repairing damage from the past and ameliorating its effects upon subsequent human beings, societies, and the world at large (Ward 1996; Brown 2010). Judaism is one of several religions that has a distinct phrase for this kind of activity, *tikkum olam*, "repairing the world" (Shatz et al. 1997). Devout practitioners of these faiths recognize an explicit relationship between human activity, including design and technological making, and their spiritual calling to effect positive changes in the world around them. Religions such as Christianity and Judaism, with their strong emphasis on historical particularity and change over time, have seen technology as a means for making up for deficiencies in the world and in society as it is, a particularly effective means to do things that positively affect the common good and undertaken in a manner consistent with their overarching spiritual values.

Consistent with this religious worldview, there can be no secular/sacred divide for many of these practitioners nor should there be, even though there is a recognition

going back to its clear exposition by Augustine in *The City of God*, that the principles of the kingdom of God are quite distinct from the principles of those who choose to continue to live in the world outside of proper recognition of God as the needful guide and supplier of grace and help to all who call upon his name. The city of man and the city of God are distinct yet within this fallen world; positive forward progress is not only possible, it is doing the very work of God as a divinely appointed co-laborer with God to repair the world. Attaining perfection is not fully achievable due to the continuing aftereffects of sin and continuing human pride, but vast improvements can occur – foreshadowing the perfect world which is to come in an anticipated eschatological revealing of a new realm of coexistence in the very (tangible) presence of God.

All technology and design activity is to be consistent with this coherent world-view that embraces the spiritual/religious foundations of all of human life. Techno-logical activities themselves are part of the active worship of the creator embodied within the concrete instantiations of human engagement with the materials of the world and fashioning and deploying them in ways that are homages to the God who brought the world into being, continually upholds it by divine will, and has commis-sioned human beings to be cocreators of order, beauty, truth, and other fundamental values. This earthen materiality aspect of religion finds the sacred mediated through objects and other human creations such as language (in spoken, written, chanted, or choral form) that invokes an interaction among texts, bodies, minds, and hearts that influence both the religions themselves and the technological practices, objects, and systems that both serve the internal purposes of religion and extend its positive influence within the wider world (Koslowski 2001; Levy 2014 provides examples from within Judaism; see Kieshnick, Kieschnick (2003) for an exploration related to Buddhism).

Possible Relationships Between Religion and Technology and Design Education

The continuing vibrancy of organized religions is consistent with the ample and largely unrecognized relationships between religion and technology that run across the world's well-known and even many lesser-known religions. Docu-mentation of these relationships is quite rich in classic major religions such as Christianity, Islam, Hinduism, Judaism, and Buddhism. So how might these beliefs, ideas, orientations, and daily practices relate to technology and design education? Here are just a few key concepts that could enrich the technology and design curriculum and classroom in a manner that makes connections among religion and technology more explicit for learners while at the same time avoiding sectarianism; building greater understanding of the cultural underpin-nings of technological artifacts, systems, ideas, and processes; and explicitly acknowledging and potentially further clarifying the power and even utility of religious ideas and beliefs within the lives of both students and teachers and within technological praxis.

Religion Can Be a Stimulant to Technological Innovation

Technology and design curriculum standards and materials across many nations have large units that deal with aspects of agriculture, food safety, and cuisine. Several major world religions have dietary laws such as *kosher* food production and preparation in Judaism (Blech 2009) and *halal* food production and preparation within Islam (Fischer 2015). These furnish good case studies to explore how arenas of daily life and global markets for food goods are heavily impacted by a series of interactions among religious ideas and beliefs, culturally conditioned practices, technological practices, and ongoing innovations (including copyrights, patents, and trademarks to protect intellectual property that emerge within these tradition on a continuing basis). More specifically, these examples demonstrate how effects of religious beliefs influence technological products, practices, and systems since articulating and enforcing food quality standards, evolving clear food labeling systems, developing efficient distribution systems that maintain product consistency, creating packaging innovations that ensure durability and requisite shelf life of the products, and creating and maintaining free trade systems that promote rapid movement of needed food staples required by millions of practitioners of these two global religions. It has also created staunch, savvy, religiously inspired advocates for government and private industry standards, written protocols, treaties, uniform and effective inspection systems, etc. The benefit to all members of society is that these orientations have helped improve global technical systems of food production, trade, quality control, transportation, logistics, marketing, and relevant financing.

A further example from Islam is the focus on engaging in one's activities with a desire to attain and maintain extreme accuracy since such efforts are rendered as part of one's service to Allah (analogous ideas occur in several other world religions). This attitude engendered serious attention to accuracy in scientific and technical endeavors that promoted the construction of timekeeping devices and astrolabes and the accurate keeping and curation of detailed astronomical observations – all hallmarks of modern science and technology praxis worldwide (Al-Hassani 2012). More broadly, metrology has been influenced since ancient times by religious needs for accurate calendars, astronomical (astrological) charting of the heavens, and accurate record keeping of other natural and human-made phenomena which has not only influenced the measurement tools themselves but also the construction of technological instruments such as astrolabes, telescopes, observatories, and timekeeping devices and technological processes associated with curation, historic preservation, translation, and education.

Religion Can Serve as a Moderator of Technological Diffusion

Researchers have studied the ways in which assistive reproductive technology, birth control methods, and practices associated with pregnancy have been heavily influenced by technological changes, medical advances, legal innovations, scientific insights, and religious beliefs in an interactive manner that has been explored across

religions such as Hinduism (Bhattacharyya 2006), Islam and its concept of *shariah* (Ayduz and Dagli 2014; Clarke 2009), various forms of Judaism (Feldman and Wollowelsky 1997; Ivy 2009; Kahn 2000), and Shintoism, Taoism, and Buddhism (Ivy 2009). Genetic advances, various medical technologies, and the prospects of transhumanism are examples of topics that have been explored in regard to Islamic religious thought (Nasr 2009), non-Western religions and cultures (Selin 2016), and Christianity (Mercer and Trothen 2014; Deane-Drummond et al. 2015). Burial practices in Japan (Keul 2015) and the veneration of ancestors in some Asian religions by the use of what are known as ancestor veneration avatars or AVAs (Bainbridge 2014) are well-documented cases of the complex influence between human technologies and religious conceptions related to the afterlife and the proper handling of the bodies of those who have passed with considerable variation within and across distinct religions.

Culturally grounded design practices have also been seen as a by-product of religion and IT interactions such as in a set of detailed studies about how educational technology is used in the Islamic world with cases drawn from Malaysia, Saudi Arabia, Pakistan, Turkey, and Islamic education in the USA that feature contrasting branches and forms of Islam, different cultural contexts, and different life experiences and exposures to those different than oneself (Thomas 2016). Whether religion leads or whether technology leads the interaction seems to vary depending on the topic, geographic location, the particular subvariety of the religion which is being practiced, the nature of the technology itself, how much it focuses on the human person, and a myriad of other factors.

Religion Can Inform and Inspire the Work of the Technologist

How scientists and engineers approach and understand the meaning, ethics, purpose, and practice of their respective tasks in laboratories and the wider world has been the subject of extensive investigation within Christianity, Hinduism and Sikhism (Cimino 2014), Judaism, Islam (Ayduz and Dagli 2014), and across these and other religious traditions in a more generalized form of inquiry (Jenkins and Tucker 2016). The historic and contemporary complex interactions among science, technology, philosophy, and religion are the subject of much research and multivolume reference works attest to the vibrancy, depth, and breadth of the relationships through time, across cultures and specific traditions, and within the wider societies within which they are embedded and embodied (Al-Hassani 2012; Ayduz and Dagli 2014; Harrison 2015; Renehov and Oviedo 2013; Selin 2016).

World religions have heavily influenced discussions within the domain of technology proper in the past and the present. Well-known philosophers of technology, inventors of technologies, historians of technology, designers, architects, graphic artists, and other contributors to technological thought and practice have both integrated and thought about technology within a complex personal interaction that includes religious experiences and sensibilities, cultural and family influences, and technological knowledge and experiences. Avowedly, Christian contributors

include influential philosophers of technology such as Albert Borgmann (1984), Frederick Ferré (1993), and Carl Mitcham (Mitcham 1994; Mitcham and Grote 1984) and public intellectuals such as Jacques Ellul (1990) and George Grant (1986). Practicing Christian engineers and other technologists have attempted from time to time to articulate guidelines for the creation and use of technologies within society (e.g., Swearengen 2007). They have also formed professional societies where they meet with their peers (e.g., Society of Ordained Scientists, an ecumenical order within the global Anglican communion, American Scientific Affiliation based in the USA and Christians in Science in the UK, and the Christian Engineering Society) and seek to help their parent religious bodies and the public at large to better understand the depth, breadth, and key issues at the nexus of technology and religion (e.g., ECLA Alliance for Faith, Science, and Technology and the Episcopal Church Network for Science, Technology, and Faith).

Other religions have mounted similar efforts to self-organize and promote inter-actions among religious adherents who make their living in scientific and technical fields (e.g., Center for Islam and Science and the International Society for Science and Religion limited to just 100 members from various religions and scientific and technical fields). For example, Hans Jonas (1984), a practicing Jew and noted philosopher of technology, sought to construct a fully secular form of ethics that could guide technological decision-making, carefully avoiding reference to the religious sources that informed his own understandings and actions. Other reli-giously aligned scholars have made explicit the many ways in which values, ethics, and theological considerations should inform science and technology practice and policy (Gorman et al. 2005).

A careful study of the eight major types of stupas in the Tibeto-Buddhist tradition demonstrates how distinct religious beliefs influenced the form of these religious objects (Dorjee 2001). Each portion of the structure down to the number of parasols on the *chatravali* has taken on deep and divergent metaphysical meanings across the various schools of thought and practice within the Tibeto-Buddhist tradition. Sim-ilarly, Buddhism and other Asian religions have influenced technological develop-ments in countries such as China helping to foster periods of intensive invention and innovation (Deng 2011; Schäfer 2011). Inventions like printing with moveable type, horse stirrups, iron plows, rotary winnowing fans, drive belts, chain pumps, suspen-sion bridges, wheelbarrows, umbrellas, matches, paper money, and spinning wheels are just a few of the multitudinous examples of technological innovations which saw their debut within the vast reaches of the various Chinese empires.

Religion Can Highlight Important Values to Be Considered in Technological Endeavors

Virtually, all technology and design frameworks highlight the role of values in undertaking technological work of various kinds. All formal religions teach general precepts of behavior, prescribe or encourage particular forms of action, and inculcate ideas about self, others, society, and human purpose(s). Well-designed discussions

can elicit a wide range of ideas that are religiously inspired as part of the classroom process of deciding what values should undergird various technological activities. Such an approach can highlight the varied sources from which values emanate, the means by which we articulate them within societies, and how groups of people sort through these values to reach mutually agreed upon ways to select, adapt, and utilize values to inform human practices. Aesthetics is a second viable area for exploration in its relationship to both religious ideas and technological endeavors as a multi-disciplinary exploration of the many faces of beauty attests (Hösle 2013).

The widespread presence of religious-affiliated institutions within human societies, including those who are part of the formal educational systems of nations around the globe, is yet another reminder of the importance of working harder to make the religion and technology connections more explicit and more deliberate. Religious-affiliated schools and universities may wish to highlight their own particular religious traditions, but quality instruction also requires that we highlight values that come from varied sources, including other religions, philosophies, and diverse groups within society. Most universities worldwide have faculty members with formal educational backgrounds in theology, religious studies, or scholars of cultural or regional studies that make them knowledgeable of the religious beliefs and practices often of several different branches within a particular religion and/or familiar with several different religions. These faculty colleagues can prove valuable allies and dialogue partners to create and deliver balanced discussions that explore the interactions among religions, religious beliefs and practices, and practices and developments related to technology and design. The Roman Catholic Church, for example, has an organized body of articulated, written, and well-organized social doctrine for its churches worldwide available in multiple languages (Pontifical Council for Justice and Peace 2005). Such a document can make such discussions not only easier to start but also help all participants (including teachers) become better informed as to official teachings of the religious group in question and why these attitudes and values are expressed as they are in relation to modern technology.

Along an analogous path, it has been suggested that foundational concepts in Asian thought, most derived explicitly or implicitly from Asian religions, can form the framework for better technological development in the future with a focus on the good, the useful, the beautiful, the true, and the holy rather than relying on standard, rational, Western management approaches that are largely but not exclusively utilitarian in their orientation (Teschner and Tomasi 2016).

Conclusion and Future Directions

Technology and religion exhibit a complex, historic, and continuing relationship (Geraci 2016; Stolow 2012). Religions can corrupt or unnecessarily hinder technological developments and practices or they can help those very practices achieve their fullest potential while limiting the destructiveness that various technologies over time have wrought (Dyer and Gordon 2011). Religion as a widespread phenomenon across time, cultures, languages, and places is part of what makes and

keeps us human in the midst of a human-designed world and humble in regard to our progress toward making the world a better place for all creatures (Herzfeld 2009). Appropriately applied, religious discourse can help articulate the ultimate concerns that should inform all technological action (Lewin 2012), thereby enriching culture rather than diminishing it (Newman 1997; Richerson and Christiansen 2013), preserving and enhancing the natural world and our continuing relationship to it (Jenkins and Tucker 2016), and saving us from undue arrogance and hubris – an all too common human tendency among the currently powerful, whomever they may be (Terlizzese 2009).

Religion and technology exhibit complex interrelationships that flow in both directions with positive, negative, and undiscernible effects. Both seek to solve problems, meet needs, and improve the human condition. Each arena is a mature field with established, well-recognized, and continuously evolving bodies of theory, practice, subfields, leaders, practitioners, educational institutions, and interactions with other arenas of human experience such as politics, societal institutions, the environment, finance and economies, international relations, humanities, arts, and the sciences.

We have an obligation to engage religious systems of thought and praxis within the context of the technology and design education curriculum and learning environment. Doing so with careful planning, appropriate preparation, sensitivity, and well-delineated case materials will help prepare present and future generations for the continuing challenges and opportunities that the ever-evolving technological world we inhabit embodies and ensure that new contributions are undertaken in a manner cognizant of the wider milieu within which these contributions occur.

For researchers, very little recent study has been done of student and teacher knowledge and attitudes toward the interaction of religion and technology. There are very few nonsectarian classroom materials for primary and secondary students engaging religion and technology at the depth suggested by this chapter yet hopefully this modest contribution has established their potential importance to high-quality technology and design education.

Cross-References

▶ From Crit to Social critique
▶ Food in the School Curriculum: A Discussion of Alternative Approaches
▶ Nomadology: A Lens to Explore the Concept of Technological Literacy
▶ Perceptions and Attitudes of Pupils Toward Technology

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