

# The Influence of Industry on Dental Education

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*Abstract:* Academic dental institutions face the growing challenge of securing the resources needed to develop a curriculum that incorporates current innovation and technology to ensure that students' learning experiences are relevant to current dental practice. As a result, university-industry relationships are becoming increasingly common in academe. While these relationships facilitate curriculum relevance, they also expose students to external market forces. The purpose of this study was to explore the influence of industry on dental education using a qualitative research study design. Analysis of semistructured interviews with thirteen Dalhousie University dental faculty members revealed two primary themes that suggest a tension between the traditional hierarchical organizational structures guiding curriculum (i.e., authoritarianism) and industry's quest for profit (i.e., entrepreneurialism). Additional themes demonstrate a belief that industry directly influences students' knowledge and understanding of evidence as well as their experience with both the formal and informal curricula. Industry's presence in academe is a concern. Dental educators, as stewards of the profession, must be nimble in brokering industry's presence without compromising the integrity of both the educational program and the teaching institution as a whole.

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Serious questions about industry influence on the dental profession were raised in 2003 when the Coca-Cola Foundation provided a one million dollar grant to the American Academy of Pediatric Dentistry Foundation (AAPDF) to support research, education, and health promotion in children. This grant led to much debate within the dental community and was perceived by many as a troubling conflict of interest that was criticized by Shenkin as “an embarrassment to the dental profession and to everyone who has strived for the past 60 years to make prevention and health promotion the cornerstone of modern dental practice” (p. 140).<sup>1</sup> The AAPDF and Coca-Cola partnership brings to light the importance of assessing the appropriateness of industry support before entering into partnerships that could create conflict or other negative outcomes and perceptions.

University-industry relationships (UIRs) are becoming increasingly common in modern post-secondary education.<sup>2-4</sup> Given the costs associated with educating dental students, academic dental institutions face enormous challenges in finding the resources to deliver a curriculum that addresses the oral health needs facing society<sup>5-10</sup> and to ensure that the curriculum remains current with ever-changing innovations and technology.<sup>11</sup> Governments are challenged to find the means to support dental programs with public resources, resulting in increased

tuition and fees.<sup>12</sup> To offset the high costs of dental education, industry partnerships are fast becoming a necessity in modern dental education. However, they are often undertaken with little understanding or reflection about how academe should recognize and respond to influences that conflict with professional and pedagogical ideals.<sup>13,14</sup>

Slaughter views faculty as the appropriate authors, administrators, and deliverers of curriculum; however, sponsors and advocacy groups external to the university play key roles in the maintenance and sometimes the existence of some curricula.<sup>15</sup> While the formal curriculum is largely expressed through course content, competency standards, and other administrative mechanisms, the “hidden curriculum” by its nature is more appropriately explored through students' lived experiences that shape their attitudes and perspectives.<sup>16</sup> The hidden curriculum represents the cultural milieu of academe and in medicine has been metaphorically described as “the memories written in the bricks and mortar of the medical school” (p. 297).<sup>17</sup> It refers to unarticulated or unexplored processes, pressures, and constraints that fall outside of the formal curriculum<sup>18</sup> and encompasses domains such as policy development and resource allocation.<sup>19</sup> Paying particular attention to influences aligned with the hidden curriculum enables us to consider learning experiences that may be intentional or unintentional, hidden or exposed, implicit or explicit, and desirable

or undesirable. DeSchepper suggests that the hidden curriculum can either add relevance to the formal curriculum or render it contradictory depending on how it is perceived by the student.<sup>20</sup> Therefore, uncovering industry's role in the hidden curriculum holds great importance for dental education.

The purpose of this study was to examine the influence of industry on dental education by, first, describing a variety of factors that may explain industry's presence within dental education and further how these factors most likely exert their influence. Second, a qualitative descriptive research approach is used to explore the experiences and perceptions of faculty members who are faced with balancing the positive and negative influences created by industry's presence within both the formal and hidden curricula.

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## Industry's Presence in Academic Dentistry

In addition to offsetting costs of dental education, there are a number of relevant factors that have contributed to the rise of industry influence in dental education in Canada.

**Limitations in public funding for dental research.** In Canada, one of the most obvious historical examples of industry's finding its way into academe had its beginnings in the 1980s and 1990s when governments sought to utilize the economic benefit of drug research by the private sector through corporate-friendly patent protection legislation in return for industry investment in research.<sup>21</sup> This was a response to government's inability to increase public sector funding. Universities were left with little choice but to look to industry for support, marking the beginning of an era that has seen an increase in academe's reliance on corporate money to support research. Corporate funding brings corporate power into academe, and rules and guidelines for governing UIRs to protect academic integrity are far from clear.<sup>21</sup> The spillover of this trend into dental research requires a revisiting of conflict of interest policy to manage faculty relationships with industry.<sup>22</sup>

**Fiscal challenges for curriculum delivery.** Academic dental institutions are beginning to rely on industry partnerships to support the hiring of new faculty members who are accustomed to earning higher salaries in private practice<sup>23</sup> and to deliver an educational experience that exposes students to technology and practice innovations.<sup>11,24</sup> In some

instances, corporate trainers provide students a "real world" experience in the business practice of dentistry.<sup>24</sup> The underlying concern with this educational approach is the potential loss of curriculum control to external influences.

Conflicts of interest are a significant challenge with UIRs. These conflicts can be ideological, financial, or intellectual, and in many cases are not easily identified or are subtle in their influence.<sup>25-27</sup> For example, the time faculty members devote to industry activities may come at the expense of academic responsibilities.<sup>2</sup> Academic research that is translatable into products and technological innovations that are dependent on private sector funds become a prime motivator for faculty entrepreneurship.<sup>28</sup> Because industry is typically market-driven, its ideology is often incongruent with the social ideology of academe.<sup>29</sup> In the case of the dental profession these conflicting paradigms are compounded by the continuing identity crises the profession faces between business and professional ideologies.<sup>30-32</sup> Industry's influence creates challenges for institutions that strive to develop and maintain socially responsible curricula.

**Continuing dental education (CDE).** The academic expertise within dental schools once provided the traditional domain of CDE, but the last decade has seen a significant shift, with up to 80 percent of CDE being offered by hospitals, specialty dental organizations, federal agencies, study clubs, education companies, dental laboratories, dental supply companies, pharmaceutical companies, and entrepreneurial for-profit institutes.<sup>33</sup> Demand for CDE has increased over this time as dental regulatory authorities require members to maintain a set number of CDE hours to maintain licensure.<sup>34</sup> Liberto notes that this changing trend in the delivery of CDE creates opportunity for industry to deliver courses that influence the practice of dentistry.<sup>33</sup> The concern here is that this may be done with limited or no academic scrutiny.

While there are many dental institutes offering excellent evidence-based CDE programs, some institutes follow a core philosophy for dental practice based upon maximum treatment (and profit) at the expense of conservative care.<sup>35</sup> The 2006 American College of Dentists (ACD) Ethics Summit on Commercialism connected the education of dentists with the rise of commercialism in the profession as evidenced by practice management courses emphasizing practice success, profit, commercial publications, and professional meetings emphasizing commercial exhibitions and symposia.<sup>36</sup>

**Fee for service model.** In Canada, oral health falls outside the umbrella of the universal health care system, creating barriers for the socioeconomically disadvantaged who therefore bear a disproportionate burden of disease.<sup>31</sup> As in other developed countries, this situates oral health care in the marketplace, raising tension between a patient-first principle and the free enterprise, for-profit principle. Coexisting market and social values must be kept in balance when maintaining the dual roles of business person and health care provider because an imbalance toward the market paradigm creates tension that may pose ethical dilemmas and undermine the public's trust in the profession.<sup>30</sup> Conflicts of interest inevitably arise in professions due to competing interests, making it important to recognize and manage these conflicts.<sup>37</sup> At the core of dentistry's professional obligations is a social contract based upon "the voluntary promise to care for those humans who are vulnerable and in need" (p. 532).<sup>37</sup> This social contract is violated when the dental profession pursues business ideals at the expense of serving the oral health needs of individuals who cannot afford care. Operationalizing the ideals of the social contract should be a hallmark of the dental profession.<sup>38</sup>

Educators also have a collective responsibility and a leadership role in defining what practices and principles have salience in the dental and broader community.<sup>31</sup> In order for individual choices by dentists to be directed toward the public good, economic and professional values need to be reconciled through the creation of more socially relevant curricula.<sup>31</sup> In the following sections, the perceptions and lived experiences of dental educators provide first-hand insights into the stewardship role of dental education.

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## Methods of This Study

Using Dalhousie University as the research site, a qualitative descriptive method was used to examine faculty members' perceptions about industry's influence on dental curricula. Qualitative inquiry allows for a flexible and interpretive approach to study questions and provides a systematic approach for data analysis.<sup>39,40</sup> This study was guided by principles of grounded theory methodology.<sup>41-44</sup> Here the approach is both constructivist and interpretivist, seeking to distill from personal accounts the experiences of participants to develop themes and patterns of meaning in the data to create a theory or storyline.<sup>45,46</sup>

Ethics approval (File #2005-69) was granted to undertake this study by the University Review Ethics Board at Mount Saint Vincent University, where safeguards to address confidentiality, anonymity, and voluntariness of interviewees were approved. Eight key informants with experience in teaching, research, and administration were purposefully selected from the Faculty of Dentistry at Dalhousie University, Halifax, Canada. The prospective interviewees were mailed invitations to participate; snowball sampling<sup>47</sup> identified additional key informants. One invitee declined to participate in the study due to work commitments. Thirteen active or retired faculty members with either full-time or part-time experience in the senior administrative, teaching, and research areas of dental education participated in the study. The participants had an average of twenty-four years and a range of six to forty-three years of experience in dental education.

The interviews were held at a location of the participant's choice using a one-on-one, semi-structured interview format. Open-ended questions were focused on uncovering faculty perspectives on whether industry partnerships should be pursued, faculty's control of the curriculum, and how industry may influence students' learning experiences. The interviews were sixty to ninety minutes in duration and were audiorecorded and transcribed by the interviewer, the principal author, and a part-time faculty member. Theoretical saturation in this study occurred at thirteen participants as no additional themes were found to emerge through constant comparison of the data performed throughout the interview process. The participants received no payment or reward for participation in the study.

The principal author analyzed the transcripts using grounded theory analytic techniques and procedures developed by Strauss and Corbin.<sup>45</sup> The approach was interpretivist whereby dialogue is co-created by interviewer and interviewee. Therefore, member-checking was not undertaken. Each verbatim interview underwent an iterative process of open coding to identify and thematically group related phrases arising from the data. Analytical comparisons were made both within and between interviews. Patterns in the data were identified to generate concepts that were further condensed into larger (macro) categories. The interpretive phase involved axial coding to link categories and to give context to identified conditions (i.e., structure) and actions/interactions (i.e., process) resulting in the development of a storyline to explain

the phenomena.<sup>45,46</sup> A pointillist painting can be used as a metaphor for the theoretical construct created in grounded theory methodology. The dots represent structure; the pattern of the dots represents process. The meaning of the composition is achieved only when structure is linked with process: “the relationship between the dots is essential to facilitating our view of the whole picture” (p. 927).<sup>48</sup>

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## Results

The analysis yielded multiple elemental categories that were identified and grouped (Figure 1). Two macro-structural categories—1) Two Solitudes: Academe and Industry, and 2) Educational Dichotomies—represent conditions and circumstances identified by participants. Six macro-categories representing process are power, awareness, advocacy, balance, accountability, and growth. Once these categories were identified, narratives were situated within accounts of structure and process that identified academic stewardship as the common thread, or core category, that ties the participants’ stories together. To mitigate potential negative outcomes associated with industry’s influence, dental educators must recognize their stewardship role and exercise self-control when considering these partnerships. The following provides a detailed explanation of categories evolving from the narratives to create the storyline. Representative verbatim quotes are included to emphasize key points.

### Two Solitudes: Academe and Industry

Two Solitudes represents the tension created when polarized ideologies interact. Academe has a mission and core values embodying the pursuit of truth and knowledge, whereas industry’s motives are viewed as an unwavering pursuit of monetary gain. As Interviewee 2 said: “I know what industry wants. Industry wants to make money. They are not in the business of being a charitable organization. So if they provide something to us we cannot compromise our integrity for any amount of money.” Academe subscribes to a hierarchical organizational structure governed by heavy academic policy, rules, and regulations. Historically, academe has been supported both privately (tuition fees) and publicly (government funds) and has been able to maintain significant power in directing the course of dental education. As

universities have begun to feel economic strains, the shift toward alleviating budgetary constraints through industry funding has blurred the line between the two solitudes (academe and industry), bringing with it a risk that education is being unduly influenced by commercial ideals.

**Authoritarianism.** According to the interviewees, the dental faculty has autonomy in making curriculum decisions. It also has a social responsibility to provide an evidence-based curriculum and an academic philosophy that supports the mission of both the faculty and the dental profession at large. Control of the dental curriculum lies within the organizational structure of the dental school whereby curriculum decisions require careful thought and reflection. As Interviewee 2 said: “Any simple decision that we make that affects our student body affects our curriculum, the didactic, the preclinical. So any change in the faculty is extremely complex and requires a whole lot of planning.” Faculties follow broad-based university policy (i.e., conflict of interest policies) designed to protect the university from nefarious activity that would not only damage its reputation, but also challenge the school’s ability to maintain accreditation status. Interviewee 4 put this succinctly: “If you lose accreditation . . . you’re dead.”

Faculties must therefore build partnerships that are congruent with morally sound education goals and expectations of society. As Interviewee 5 explained it: “The university as a whole has a responsibility to the general public, to its funding partners, in this case the government, and so that would prevent any kind of overtly and hopefully covertly exclusive industrial link that’s going to potentially bias the kind of educational experience that the students have.” Dental faculties must protect academic integrity and autonomy by ensuring that any arrangements with industry support the mission of the faculty. “Industry,” as stated by Interviewee 10, “is a guest in the temple of academe.”

**Entrepreneurialism.** Interviewees held the universal view that industry’s primary motive was its quest for profit and reported a variety of techniques used by industry to achieve this end. For example, industry pursues exclusivity contracts in academic settings because it views students as potential clients, making the dental school a venue to showcase and market products and equipment to a captive audience. “I think that the product should be used in the university based on its reputation and quality and not because of an exclusivity clause,” said Interviewee 9. “I can see some potential there that students are

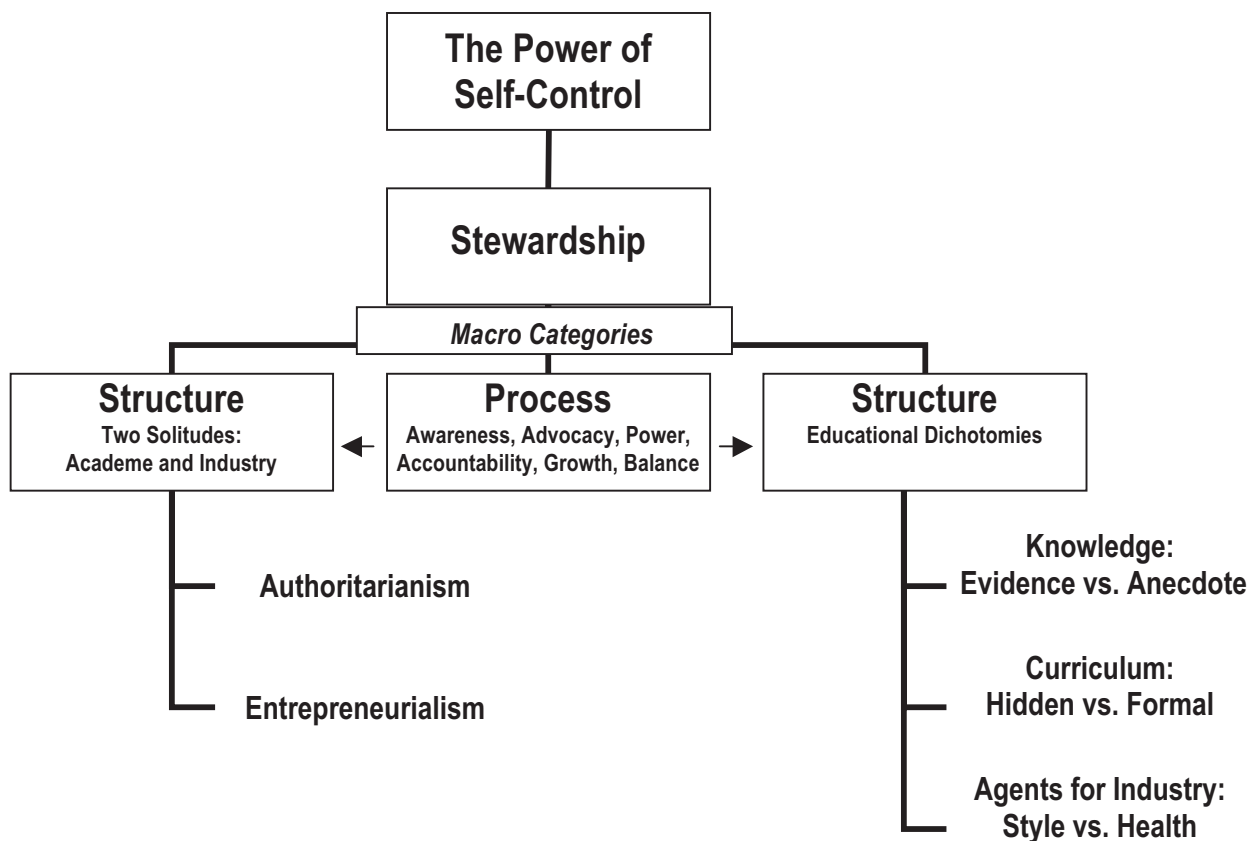


Figure 1. Conditional matrix representing the substantive theory of the power of self-control

denied learning other products and the benefits of other products.”

Exclusivity needs to be approached with caution. In cases in which faculty members are limited by time and can only teach a single system or technique, exclusivity arrangements require thorough investigation to ensure the integrity of the curriculum is not compromised. Associating a procedure or a material with a particular product brand narrows the scope of learning. As Interviewee 2 said, “When you set up a system like implants or rotary endodontics, most faculties can’t afford to have three different types of rotary endo in place, so from an educational standpoint and a practical way we normally deal with one company.”

Marketing tactics such as rebates and incentive programs are also used by industry to gain a foothold in the marketplace and can have a negative impact. Interviewee 13 stated: “And I don’t like industry

lowering the bar on its own product by suggesting that to get you to buy this we have to give you the bonus; that this product is not good enough as far as you’re concerned to buy on its own merit.” Industry and academe are better served by an evidence-based approach and critical assessment of fairly priced products.

Financial gain and profitability are often used as the yardstick to define practice success—a measure that is not lost on industry marketing strategies. Industry promotes the notion that this measure of success is reached by incorporating cutting-edge technology into dental practices, an ideology that ironically may only guarantee profitability, with no particular value in improving patient care. “There’s a tremendous shift in recent years towards profit as being the motive for doing dentistry,” commented Interviewee 12. “That you evaluate yourself not on the basis of the quality of what you are doing and



the care that you are giving patients, but whether you have ‘X’ machine that sits in your office. The dentists who are their promoters will quite comfortably say if you don’t have ‘X’ machine you are in the stone age.” This focus on the cutting-edge creates a culture of competition within the profession and jeopardizes access to care for patients who cannot afford escalating treatment costs.

Industry’s actions may appear to be well-intentioned gestures to promote learning and enhance patient care when in actual fact it is financially motivated. As Interviewee 3 said, “In some ways there may be a very small element of social justice there. That perhaps this will benefit the patient in some little way. But what they mainly want to do is to sell it to you so that you can make a profit and they make a return by selling the product to you. In other words, if their investment produces a socially just benefit, it is merely an unexpected positive outcome.”

## Educational Dichotomies

Educational Dichotomies is the theme that describes the multiple ways in which industry may influence pedagogical values implicit in dental education. The interviewees’ comments revealed three domains—knowledge, curriculum, and professional identity—where industry’s influence creates or amplifies existing tensions.

**Knowledge: evidence-based versus anecdotal.** It is becoming increasingly accepted in academe that evidence-based knowledge should be the foundation on which teaching, research, and policy development are based. Interviewee 5 commented: “I mean it comes down to show me the money, show me the evidence. Anecdotal [only] takes you so far and after awhile to hear that’s how I’ve always done it is not good enough and we know that’s not good enough.” Dental schools are trusted with the responsibility of teaching students to become competent practitioners and critical thinkers. As such, dental faculties must create an environment for the pursuit of evidence-based knowledge and inquiry that will provide students with the tools needed for critical assessment throughout their professional careers. This skill in large part is taught in evidence-based dentistry courses; however, in order to achieve this competence, critical thinking must span the curriculum.

Industry partnerships that directly affect educational outcomes must include assurances that choices to partner with a particular industry or product are based on sound evidence. This requires

careful attention to examining both research and the sources of research findings that would support the collaboration. Interviewee 13 explained it this way: “Critical thinking: we need this for our students and we need this for ourselves. Allowing industry into our environment can only work well if we are critical thinkers and we have to make sure we are critical thinkers; otherwise, the industry-educator-university relationship will never work.”

The growing interaction between industry and academe calls for the formulation of guidelines to ensure that control of dental education is not unduly influenced by industry. Also important is that guidelines be created in a spirit that fosters the development of UIRs and does not place obstacles in the way of partnerships that could be mutually beneficial. “It would be a mistake for the university to come up with guidelines that the university develops totally,” said Interviewee 13. “And industry should take umbrage at that procedure because one thing it implies is that industry is incapable of working together with the university to develop guidelines. Not to have industry participation would set up terrible barriers for everybody.”

**Curriculum: formal and hidden.** Dental education challenges students to change their focus from the self to the patient—a philosophical shift that advocates the pursuit of patient needs ahead of personal gain. Interviewee 6 explained: “Now we’re dealing with a group of people who are highly successful at competing among themselves and with others for good marks. So they are virtual experts in how to advance their own case effectively. We have a big responsibility to harness that skill so they are no longer competing for themselves as much as they were, but they are now competing for their patient’s well-being.” Patient-centered curriculum goals are central to the ethical and professional development of the dental student. Ethical sensitivity and behavior instilled within the hidden curriculum can create positive learning outcomes. This is evident in the responsibilities faculty members have in serving as role models for students. Interviewee 7 said: “We very often talk to faculty and say everything we do is curriculum, every time we sit down with students to have a chat . . . everything you are doing is the hidden curriculum. You are influencing students.”

Therefore, the influence of the hidden curriculum in dental education is not exclusive to student experience, but rather is faculty-wide. A dental faculty is made up of educators from diverse backgrounds with unique experiences. An obvious

example of variation in faculty is that found between full-time and part-time members. Typically, full-time faculty members take responsibility for establishing a formal curriculum that seeks an evidence-based approach. Although the teaching responsibilities of part-time faculty members are aligned with the overall curriculum (usually through hands-on clinical teaching), they may be viewed as having a more anecdotal approach. “We have part-timers coming in who have never taught and are suddenly in positions of influence on the clinic floor,” said Interviewee 12, “and I personally think that a lot of the time [they] have no idea what they are teaching.”

Although it is important that students are exposed to the lived experiences of practitioners, if messages are at odds with the formal curriculum it can mislead or create confusion for students. This divergence represents a potential loss of control over the curriculum. Interviewee 3 said: “I find that part-time people are out there practicing everyday and are using different methods and different techniques and they wonder why students are still using this method. We don’t do enough work in educating the part-timers.”

Tenure and promotion are also elements of academe that foster increased industry influence within the curriculum. In science and clinical realms of academe, tenure and promotion typically demand scholarship arising from primary research. The academic culture is known to place greater value on research, therefore creating a market for performing research—potentially to the detriment of teaching. “There was always a certain amount of animosity between the two [teachers and researchers] because for years the person who got promoted was the researcher,” said Interviewee 3. “But you will always get this dichotomy within the committee of who does research versus teaching and the weight of each, and a lot of people complain research is too heavily weighted.” The competition for health research funding from public granting agencies is intense with low success rates. Contract research funding from industry, however, may be more easily obtained. It is a means to perform research required for academic advancement but creates closer ties between faculty and industry. Interviewee 8 explained this attraction: “I mean you have to do research to advance on the academic ladder. If you can get industry-sponsored research, it is a lot easier to get depending on what you are doing to get that money than a national health research grant where the success rate is 12 percent or 20 percent. To approach industry, or if they approach

you, you can be sure that if it is a good research design, then you will get funding for that. You get papers for it, it goes on your CV, and you produce something.”

**Agents for industry: style versus health.** A focus on beauty in Western media inadvertently fosters oral health messaging that creates a standard for the perfect smile and a market for cosmetic dentistry. While cosmetic dentistry provides a useful public service, there is concern that it is beginning to overshadow the health aspect of dental practice. “I have no objection to cosmetic dentistry, I think it is needed, but I don’t like the emphasis on it,” said Interviewee 7. “The general public thinks of dentists as people who make straight smiles as opposed to combating chronic diseases or diagnosing cancers and [promoting] oral health. And I think many of the ads that you see show very good-looking people, especially good-looking young women with these California-type smiles that I think is the wrong emphasis.”

Pursuit of esthetic goals in dentistry encourages the profession to shift more and more toward elective procedures focused on cosmetic interventions. Even organized dentistry has devoted considerable effort in public oral health campaigns branding “the smile.” This is viewed by many as sending the wrong message. As Interviewee 6 commented, “Association X has been remarkably successful with this happy face with a smile and my intention is not to directly criticize the Association X, but it trivializes oral disease.” Practitioners respond by providing cosmetic options, and industry supports the esthetic enterprise through research, development, and marketing of relevant products. Academe must be sensitive to the values driving this treatment philosophy and must balance curriculum goals to ensure that patient-centered values focusing on health are not lost. “In my view I don’t think that having style is as important as proper management of cleft lip and palate, oral cancer, basic oral care for institutionalized people, oral health care for the elderly,” said Interviewee 6. “We’ve got to get that message out to the students and reverse the current circumstances where market forces are driving what we do.”

Style over health has also given traction to the dental education industry. Nonacademic institutes and industry-sponsored CDE often promote a market-oriented practice philosophy. Interviewee 12 commented: “I think any time a corporation sponsors a CE course that they’re really not there out of the goodness of their heart. They’re there because they want to promote and sell product.” Industry is also

seen to exploit education by seeking well-respected clinicians to teach courses using educational content based on their products. Interviewee 6 explained: “So they may come to a very good clinician and say, ‘We would like you to give ten lectures on how you use our product. We are not asking you to say others’ products are bad, but we are asking you to participate in a so-called continuing education program.’ This is what I call the indirect endorsement. CDE is needed to implement new skills and techniques, but it must include critical assessment of non-academic-based CDE curricula.”

## Process Categories

Six substantive process categories (awareness, growth, balance, power, accountability, and advocacy) were identified to represent the process or interaction within and amongst the structural categories described (Figure 1). Faculties must be *aware* of the sociological dynamics within academe that focus not only on student competence in core subjects, but also in developing ethical sensitivity and competence necessary for the creation of an identity that is consistent with professional values. This awareness must expand to elements of the hidden curriculum that are potentially harmful to the goals of dental education and to the development of appropriate responses to these influences.

One of the primary purposes for industry to partner with dental faculties is to foster *growth* in capacity for delivering innovative learning experiences, carrying out research, and taking a leadership role in professional development for both faculty members and practitioners. Maintaining relevance in these various spheres is a constant challenge for faculties. Therefore, motivation for growth resulting from industry partnerships must continuously be *balanced* with goals that are consistent with a institution’s mission. For example, favorable results from industry-sponsored research may be perceived as product endorsement. Unfavorable results create ethical concerns for academics if questions surrounding intellectual property and the suppression of negative results are raised. It is vitally important for research contracts to be thoroughly reviewed before embarking on research endeavors to ensure that industry is not in a position to control university-based research initiatives and agendas. Moreover, balancing private sector growth in CDE requires academe to assume a greater role by providing a spectrum of evidence-based and socially sensitive curricula as an alternative

to courses sponsored exclusively by industry. Doing so would mark a return to an emphasis on health over the esthetic and strengthen the public’s trust in the profession.

Whenever academe encounters external influences with conflicting ideology such as industry, there is a risk for tensions to arise. In the face of balancing conflicting ideals, faculties must ultimately protect the integrity and credibility of their programs. While financial and technological need may create vulnerability for faculties entering into partnerships, their *power* in mitigating undue industry influence rests on sound organizational structure and policies regarding curriculum content. Working hand-in-hand with power is a requirement for *accountability* about policies and decisions made that affect stakeholders in academe such as students, faculty members, administrators, researchers, the profession, and the public served. Relationships with industry must be relevant to faculty and stakeholders, open and transparent, and supported by evidence and must come with a mechanism for ensuring ongoing accountability. Again, this latter goal will only be achieved with careful attention to appropriate policies and organizational structures.

The final process category influencing the storyline is *advocacy*. The mission of academic institutions, especially those that are publicly funded, typically fosters core values that are consistent with serving the greater good of society. Among the most prevalent values is an alliance with activities that promote social justice within society. Partnering with industry may risk this alliance since values arising from market forces would not be perceived to be altruistic or motivated by a commitment to social justice. If indeed industry partnerships become an accepted reality within faculties of dentistry, educators and students may be required to play an advocacy role to support the maintenance of attention to the social justice agenda. If industry’s participation rests only on goals associated with marketing and receiving a return on investment, academe must remain steadfast about setting clear boundaries in its negotiations.

## Central Category: Stewardship

Stewardship was identified as the central category where structure meets process and holds the explanatory power needed to build theory surrounding the influence of industry on dental education. The central category of stewardship is underscored by the comment that dental education must, as Interviewee



6 said, be “mission-sensitive and market-savvy”—the central theme upon which the substantive theory of the “power of self-control” was built. University-based dental education has a significant responsibility as it is the locus for enculturation of laypeople into professionals. Academe is the site of cultural determinism, and its faculties use curriculum as the mechanism to develop the student’s professional identity. It is the structure and processes of academic stewardship that enable faculties to exercise the power of self-control—a role and a responsibility that faculty members must understand in order to withstand external influences such as those from industry.

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## Discussion

John Dewey said that “the ideal aim of education is creation of power of self-control” (p. 64) whereby one seeks intellectual and moral freedom for the development of mind and character.<sup>49</sup> The influence of industry on dental education creates a clash of academic and corporate philosophies over the control of knowledge, the curriculum, and professional culture. Industry’s push to incorporate entrepreneurialism into institutions does not create freedom but poses risk as academe loses autonomy in pursuits motivated by market forces and its own need to offset inadequate resources to fund education. The findings of our study suggest that resources from industry may act as a trigger for a cascade of sociopolitical issues that play out within both the formal and hidden curricula, research, and continuing education. It is academe’s responsibility to maintain stewardship through processes described in order to enhance and protect educational experiences and outcomes. Although this study highlights many aspects of industry’s influence on education, it is the faculties’ responsibility to continue to examine academe’s susceptibility to industry’s influence. Moreover, strategies must be developed to offset existing challenges.

“For those who like hierarchy,” say Greenwood and Levin, “universities are wonderful places” (p. 437).<sup>50</sup> The hierarchical divisions within universities complement the compartmentalization of academe, facilitating the defense of organizational autonomy and its intellectual agenda.<sup>50,51</sup> According to Dewey, the freedom to think critically within the organizational structure of academe fosters self-control, whereas the absence of structure only creates the illusion of freedom as control is exerted by accidental

circumstances—forces under no one’s command.<sup>49</sup> For example, the acceptance of exclusivity of particular brands and products in teaching clinics may seem, on the surface, to be practical and rather innocuous. However, as we have described, this practice may limit educators’ freedom to expand students’ exposure to a breadth of choices.

Recognizing and addressing the need for structure to mitigate industry’s influence will go a long way toward maintaining academic integrity. Faculty members must be aware of industry’s motives and provide mechanisms for collaboration that are consistent with the mission and values of their institutions. This study suggests a need to consider the following:

1. Developing and following guidelines based upon core academic principles should be considered when structuring all types of UIR agreements. A rational scheme of cocreated principles and guidelines will enable academe and industry to find common ground for a mutually accepted coexistence.
2. Faculty development is key to limiting the negative effects of corporate influence on the hidden curriculum. Faculty members need to understand the principles of curriculum design and curriculum decisions to ensure the learning experience of students supports their ethical and moral development; to address those elements of the hidden curriculum that have a deleterious influence on the educational experience of students; to ensure evidence-based approaches are not undermined with anecdote; to create greater consistency in the clinical curriculum by calibrating the level of instruction and evaluation; and to promote the exchange of ideas between research and teaching faculties.
3. The power that dental faculties hold in shaping dentistry’s professional identity should be recognized, along with the necessity to address professional education through evidence-based CDE programs to help insulate dentistry from harmful industry influence. Dental education transforms laypeople into dental professionals, but due to market influence following graduation, the professional identity blurs. The dental profession faces the hazard of industry-sponsored CDE whose primary purpose is not to educate dentists but to achieve monetary gain by exposing the profession to market influences. Practitioners shift their interpretation of their professional identity away from a humanistic purpose towards a market purpose, thereby creating greater emphasis on an economic social

construct of the dental profession. Dental faculties have the power to regain influence in shaping professional attitudes beyond predoctoral studies by expanding their scope of influence through evidence-based CDE. The organizational structure and policies of academe need to provide a mechanism that fosters the development of UIRs yet protects the integrity and authority of the university to secure CDE resources.

Although this study demonstrates that faculty members want to be cautious about embracing industry partnerships, they also recognize the political and economic realities that propel these relationships. In developing curricula, these findings provide some commentary on how faculties could collaborate with industry while attending to the potential risks and conflicts that may arise with these types of arrangements.

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## Conclusion

This study revealed faculty sentiments about the influence of industry on dental education and, ultimately, on students. By systematically identifying common perceptions and concerns, we were able to develop a deeper understanding of the many factors at play when corporate and academic ideals intersect. Lastly, we were able to suggest key strategies for offsetting the challenges of industry's influence. While these strategies may be unique to particular institutional settings, these findings provide a starting point for consideration of policy and practice for appropriate curriculum development.

Dental education needs to remain honest and true to its mission, yet be nimble in brokering industry influence without compromising the integrity of the institution. Academe must maintain health before style, evidence before anecdote, and the patient's interest before profit. It is vital that academe create a learning environment that fosters positive educational experiences for students to develop a professional identity that serves the public's needs—an activity that increasingly requires industry assistance to achieve educational outcomes. Lewis et al. best capture the essence of academe's diligence for approaching industry partnership: "Dance carefully with the porcupine, and know in advance the price of intimacy" (p.785).<sup>21</sup>

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