Beyond Digital: Exploring the Influence of Two Disruptive Technologies on Marketing Education

Matt Elbeck
Sorrell College of Business
Troy University – Dothan, USA
Email: melbeck@troy.edu

Abstract

This paper explores how the disruptive technologies of cognitive computing and robotics might influence marketing education. The extant literature reports modest yet promising advances for education in general. A pilot study in a Principles of Marketing class suggests students are aware of the likely influence these technology disruptors will have on career choice. For the educator, a proposed solution is a technology marketing curriculum developed with guidance from senior marketing educators at AACSB-accredited schools. Discussion includes how these technology disruptors might enhance marketing education and improve the career prospects of our students.

Key words: Technology disruptors, cognitive computing, robotics, marketing education.

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Introduction

The importance of situation/environment awareness and prioritizing for action are ever pressing as marketing departments take on more complex roles and collaborations (AMA, 2018) and yet “business schools need to become more dynamic, innovative and responsive to succeed” (Hall et al., 2015, p.348). Influencing program and student success are perennial questions facing marketing educators, and educators in general: which technology will improve student knowledge and skill development, and which technology/ies should students be familiar with to best prepare them for successful careers? One forward looking answer would be to consider the disruptive technologies of cognitive computing and robotics on marketing education and student career choice.

The purpose of this paper is to explore the technological disruptors of cognitive computing and robotics on marketing education and start a conversation about how these disruptive innovations evolve as beneficial to marketing education, and education in general.

Literature Review

The term disruptive technology was first coined by Christensen (1997) and defined as technologies that improve a good or service in unanticipated ways, eventually displacing the incumbent technology (Christensen et al., 2004). The key point is that disruptive technologies work not by confronting established practice, but by doing something new (Christensen et al., 2008).

Though disruptive, some technologies do result in new practices such as the cloud and Wi-Fi (CB Insights, 2017), many face organizational challenges (Lucas & Goh, 2009), whilst others do not. For example, Learning Management Systems (LMS) offered the potential to transform higher education pedagogy and curriculum (Blin & Munro, 2008), that has typically reproduced, rather than transformed, existing approaches to learning and teaching (Fry & Love, 2011). The danger of complacency is captured with the following quote, “established incumbents in the B-school world have remained committed to a high-cost business model that served them well in the second half of the past century but that has disconnected their faculties, to a large extent, from the real world of business practice and that may be compromising their future adaptation and survival” (Kimberly & Bouchikhi, 2016, p.5).

Educators should therefore respond to changes in their environment (that includes technology) to best prepare their students for an unknown future. Two likely disruptive technologies influencing tomorrow’s world are knowledge work (aka cognitive computing) and robotics (Fenwick & Schadler, 2017; Manyika et al., 2013) which this paper explores to benefit marketing education.

The first disruptive technology of cognitive computing is based on hardware and/or software to improve human decision making by mimicking the human brain (Li et al., 2015; Terdiman, 2014). The distinction between artificial intelligence (AI) and cognitive computing is subtle. AI is results oriented and clerical in nature such as ‘to offer a principles of marketing course the instructor must cover the following topics.’ Cognitive computing is consultative in nature that reflects a deep understanding of both instructor and students. An example would be ‘based on the student learning styles, why not consider role playing?’ The second disruptive technology is the tangible robot that shows promise dynamically interacting with humans and contributing to improved task performance (Reed et al., 2005; Mörtl et al., 2012).

Robotics and Cognitive Computing in Education. Robot interaction with students is considered an effective and efficient method for computer-based education
(Brown et al., 2013), in part because robots offer social cues (Leite et al., 2013) and over time students perceive them as social partners (Kennedy et al., 2015).

At the K-12 level, robots have been used to teach English to South Korean children, to help autistic children in England, and to teach foreign languages in the U.S. to preschoolers (Powell, 2014). Human teachers have used robots in a geographically remote classroom (Gray, 2015), resulting in much higher interaction versus a human teacher (Serholt et al., 2015). A reverse teaching design by Tanaka and Matsuzoe (2012) programmed the robot to make mistakes and allow children to ‘teach’ the robot with positive results. Finally, Sharkey (2016) suggests that children can learn from robots, especially languages. In higher education, pilot studies report robots delivering educational information in history (Park et al., 2011), English (You et al., 2006), science (Edwards, 2003), and engineering (McLurkin et al., 2013).

The literature on robot educators is encouraging, though falls short when reporting positive learning outcomes. Cognitive computing has the potential to strengthen robot educator customer engagement (Finch et al., 2017) by interacting with students to identify individual strengths and weaknesses to develop pedagogy and curriculum to improve student learning (Coccoli et al., 2016).

**Marketing Educator Adoption:** The popular technology acceptance model (TAM) proposed by Davis (1986) and developed as TAM2 helps explain 60 percent of user adoption (Venkatesh & Davis, 2000). By raising user perceptions of ease of use and usefulness, it is possible to influence attitude, then behavioral intention to adopt. TAM has been successfully applied for both service and social robots (Shin & Choo, 2011; Park & del Pobil, 2013) and more recently as teaching assistant robots where perceived usefulness directly influences robot adoption (Park & Kwon, 2016).

For the specific case of adoption by marketing educators, Wolfinbarger (2002) suggest that adoption evolves over three ‘waves.’ Wave 1 occurs as cognitive computing and robots offer improvements in efficiency. Wave 2 is where the marketing educator has substantial input regarding the application of both technologies to classroom activities, and Wave 3 embodies the marketing educator’s creativity to advance the learning environment using these technologies.

In summary, and financial constraints aside, the literature suggests that for marketing educators to adopt cognitive computing and robots into the classroom requires high levels of perceived usefulness and input from marketing educators.

**Methodology and Results**

Two exploratory pilot studies are presented. The first qualitatively addresses student awareness of the likely influence of these technology disruptors on career choice. The second proposes a curriculum to embrace these and other technology disruptors to benefit student success.

**Student Perceptions:** Student interest and a desire to learn more about the influence of technology disruptors on their academic preparation and career pathways is central to change in marketing curriculum and programming. A qualitative pilot study in a Principles of Marketing class (n=28, mean age=23.07 years and SD=4.04 years, 64% female, average GPA=3.1, 93% business majors) were presented a 20-minute PowerPoint presentation outlining what market leaders have stated regarding the influence of disruptive technologies on the employment landscape, and a review of the types of professions robots and cognitive computing are likely to dominate in the decades ahead. A week later, the students were given a two-question open-ended survey and to allow for reflection, were asked to return the completed survey a week
later. The introduction was “Assume robots will proliferate in the workplace over the next decade or two” followed with “which three careers would you not consider” and “which three careers would you favorably consider.”

Results in Table 1 suggest strong student awareness (when mentioned 3 or more times) to avoid highly repetitive process driven jobs and seek people-oriented professions and those requiring specialized knowledge and decision making. These findings are corroborated by PricewaterhouseCoopers (2017) that cautions against careers heavily reliant on repetitiveness, well-defined procedures, physical danger, and required muscle-power; and promoting the more technology resilient careers as “human touch” types such as customer service, arts and entertainment, human health and social work, and education.

Table 1: 
Student career preferences in reaction to the proliferation of robots in the workplace (n=28)

<table>
<thead>
<tr>
<th>Emphasis</th>
<th>Careers to avoid</th>
<th>Favorable careers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mentioned ≥ 3</td>
<td>Truck driver, farmer, secretary, factory assembly</td>
<td>IT, software engineer, data scientist, robotics</td>
</tr>
<tr>
<td>times</td>
<td>line member, accountant, receptionist, sales (takers),</td>
<td>R&amp;D, engineering, nurse, elder care, robot</td>
</tr>
<tr>
<td></td>
<td>truck driver, clerical, security, telemarketing.</td>
<td>coding, entrepreneur.</td>
</tr>
<tr>
<td>Mentioned &lt; 3</td>
<td>Electrical assembler, cashier, customer service,</td>
<td>Technology repairman, CEO, medicine, law,</td>
</tr>
<tr>
<td>times</td>
<td>accountant, transportation/logistics, teachers, chef,</td>
<td>human care, secondary education, counseling,</td>
</tr>
<tr>
<td></td>
<td>lawyer, languages, housekeeping, tour guide.</td>
<td>advertising, healthcare, sales (getters),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>surgeon, cybernetics, marketing, product</td>
</tr>
<tr>
<td></td>
<td></td>
<td>design, aviation pilot, politician, financial</td>
</tr>
<tr>
<td></td>
<td></td>
<td>advisor.</td>
</tr>
</tbody>
</table>

That students are aware of the likely influence these technology disruptors will have on career choice and strong anecdotal interest in marketing program response, prompts reflection about a possible solution for marketing students. Given most graduating marketing students have minimal computer, engineering or biotechnology backgrounds, any program should capitalize on student ability and interest. The result is a focus on technology marketing that is outlined below.

**Expert Insights.** Introducing teaching assistant robots and exposure to the power and benefits of cognitive computing may at first succeed due to the novelty effect, though over time the benefits for student knowledge, skill and career preparation will likely dominate. Most marketing students understand selling and strategy, and therefore a useful starting point would be to develop a Center for Technology Marketing (CTM) serving as a stepping-stone for the development of courses and programs, and a structure for external funding. The following details one graduate program proposal.

A survey of experts (Cooke & Goossens, 2008) is used to gain insights into a proposed graduate program in technology marketing. The curriculum details were e-mailed to seven senior marketing faculty at the following AACSB-accredited schools. University of Denver, HEC Paris, Babson College, James Madison University, Texas State University, Christopher Newport University, and Kansas State University. All seven exerts responded by inserting their comments in a reply email.

The responses were very positive together with a variety of suggested improvements that typified the advantages and limitations at their host institution. This work-in-progress is presented in Table 2 below (course descriptions available from the author). To keep the program as state of the art as possible, we also recommend a Technology
Marketing Master Guest Lecture Series, or similarly titled guest series. The case may also be made for an undergraduate major in technology marketing.

**Table 2:**
*Suggested course titles and sequence for MS Technology Marketing Program*

<table>
<thead>
<tr>
<th>Course Codes</th>
<th>Course Titles</th>
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<tbody>
<tr>
<td>TM6601</td>
<td>Importance of Technology Marketing</td>
</tr>
<tr>
<td>TM6602</td>
<td>Integrated Marketing Communications (includes Technology Event Marketing)</td>
</tr>
<tr>
<td>TM6603</td>
<td>Professional Selling of Technology</td>
</tr>
<tr>
<td>TM6604</td>
<td>Sales Force Leadership for Technology</td>
</tr>
<tr>
<td>TM6605</td>
<td>Project Management</td>
</tr>
<tr>
<td>TM6606</td>
<td>Advanced Professional Selling of Technology</td>
</tr>
<tr>
<td>TM6607</td>
<td>Business Negotiation</td>
</tr>
<tr>
<td>TM6608</td>
<td>Cloud Computing and Database Marketing</td>
</tr>
<tr>
<td>TM6609</td>
<td>Purchasing Policies &amp; Procedures in the Technology Space</td>
</tr>
<tr>
<td>TM6610</td>
<td>Marketing Analysis, Decision Making and Forecasting for Technology Products and Markets</td>
</tr>
</tbody>
</table>

The program suggested in Table 2 embodies a strong sales bias that is consistent with the professional literature's suggestion that jobs involving high levels of social (emotional) skills will grow in numbers (Gershon, 2017).

**Discussion**

Customer value for goods and services is conceptualized as a weighted “get” to “give” set of attributes (Heskett *et al*., 1994) resulting in a trade-off between what is received (quality, benefits, and utilities) and what is sacrificed (price, opportunity cost, maintenance and learning cost) (Wang *et al*., 2004). Table 3 integrates the expected value components for the marketing educator.

**Table 3:**
*Cognitive Computing and Robotics as Value Added for the Marketing Educator*

<table>
<thead>
<tr>
<th>Costs and Benefits</th>
<th>Remarks</th>
</tr>
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<tbody>
<tr>
<td><strong>Marketing educator benefits</strong></td>
<td></td>
</tr>
<tr>
<td>Instruction</td>
<td>Teaching assistant robots recognize every student in class, help develop one-to-one relationships, and offer in-class examples that are cloud sourced.</td>
</tr>
<tr>
<td>Scholarship</td>
<td>On demand literature and statistical skills plus conference timing and journal requirements (Marshall <em>et al</em>., 2017).</td>
</tr>
<tr>
<td>Service - governance</td>
<td>Transcribe reports, advise on legal issues and data search for benchmarking purposes.</td>
</tr>
<tr>
<td>Service – external relations</td>
<td>Assist in presenting initiatives to key stakeholders such as prospective students and the community.</td>
</tr>
<tr>
<td><strong>Marketing educator costs</strong></td>
<td></td>
</tr>
<tr>
<td>Stress</td>
<td>Learning about a new and untested product. Fear about software failure.</td>
</tr>
<tr>
<td>Opportunity</td>
<td>Dissonance at what other more productive activity/ies the educator might undertake.</td>
</tr>
<tr>
<td>Learning</td>
<td>For tech-savvy educators the cost is minimal. For non-tech savvy educators, this may well be the straw that breaks the camel’s back in terms of adoption.</td>
</tr>
</tbody>
</table>
Though robots may initially serve as teaching assistants, it is perhaps cognitive computing that may evolve as the dominant technology by aggregating various sources of relevance and quality to allow for human-like guidance (Murtaza et al., 2016) to help educators know their students better (Green, 2016).

**Conclusion**

As with most technology-related predictions that are rarely accurate (Armstrong et al., 2014), over the next decade it is conceivable that cognitive computing and robots will help the marketing educator by minimizing clerical burden and enhancing intellectual pursuits for contributions in scholarship, governance and instruction.

For our students, we should expect a different set of employment and career opportunities and be cognizant that people skills are the most difficult for technology to mimic (Gershon, 2017). According to Nelson (2018), technology can displace jobs, yet simultaneously create demand for those with advanced technology skills. For example, from 2011 to 2017, Goldman Sachs replaced 600 desk traders with 200 coding engineers (Henry-Nickie, 2017). The focus should be on which hitherto unknown careers will emerge and to prepare our students for those careers.

It is the informed marketing educator who recognizes the use and benefit of cognitive computing and robotics and who is a major participant in the implementation of these disruptive technologies, allowing new processes in education to occur for student learning and career preparedness.

**References**


