Harnessing Digital Disruption With Marketing Simulations

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Abstract

A marketing simulation represents a comprehensive and integrative business environment in which students actively manage firms that compete against each other. This article describes how marketing simulations harness digital disruption to enhance learning processes and outcomes and (ultimately) prepare students for their future careers. The article focuses on comprehensive marketing simulations, which have more decision variables and incorporate authentic competition, rather than "play against the machine" games. It defines digital disruption as the change that occurs when new digital technologies change customer experiences, business processes, and business models, thereby changing how value is cocreated. The article begins by describing how simulations capture digital disruption in the marketplace and harness it to improve students' learning experiences and outcomes. The description reflects the authors' experiences with the LINKS suite of simulations (www.LINKS-simulations.com), as well as the experiences of other instructors and students. The article then discusses pedagogical opportunities and class activities that enhance learning experiences connected with digital disruption in business ecosystems. It closes by emphasizing three best practices for marketing educators. The discussion applies to undergraduate, MBA, executive MBA, and programs targeted at other student groups (e.g., in-house corporate programs).

Keywords

simulation/gaming, technology in classroom, employer needs, digital disruption, marketplace disruption

Advances in digital technology are transforming the marketplace—requiring rapid innovation by colleges and universities (AACSB, 2016). Business schools have embraced technology platforms to advance and customize learning, including online, modular, collaborative, and just-in-time learning experiences (Frontczak & Kelly, 2000; Karns, 2005; Ponzurick, France, & Logar, 2000). Marketing educators are seeking new ways of using digital technology to improve educational processes and outcomes (Malhotra, 2002), as well as to prepare students for a technology-infused workplace and marketplace. Digital disruption is the change that occurs when new digital technologies change customer experiences, business processes and business models, thereby changing how value is cocreated by actors in an ecosystem.

Digital technology is rapidly transforming business processes, communication processes, and customer activities—disrupting and destabilizing markets, but also enabling the creation of new ones (*Forbes Insights Team*, 2018). "Digital disruption is less a single event than a process that manifests itself over time . . . [It] means different things within different functions and locations in the business model" (Crittenden, Crittenden, & Crittenden, 2018, p. 17). Digitization is disrupting traditional business models in three distinct ways. First, customers prefer (and expect) to collaborate within a value network throughout the purchase journey (Lemon & Verhoef, 2016). Customers seek engagement and opportunities to cocreate with firms, intermediaries, and other customers throughout product design, development, and delivery processes. Customer preferences are changing rapidly and firms are scrambling to keep up with them; customer loyalty goes only so far as the firm's ability to meet these evolving needs (Crittenden, Crittenden, & Crittenden, 2017). Successful firms are better able to harness and exploit digital technologies to acquire, retain, and enhance collaborative relationships with customers.

Second, business models are being overturned due to the many ways that information technology has digitized business processes, especially customer relationship management, sales force automation, and operations management. A key characteristic of business process change is that

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information is shared in new ways (e.g., Netflix and Airbnb). When firms develop new capabilities based on mastery of these processes, they are able to compete in new ways—shaping markets, as well as responding to them. Third, interactive digital and social media have facilitated mobile geotargeting, improved customer service, enabled new payment methods, and (sometimes) disintermediated relationships between firms and traditional intermediaries (Waters, 2015). Firms must acquire or build new in-house capabilities or seek out new channel partners, so that they can interact with intermediaries and customers in new and better ways. These capabilities create a competitive advantage in almost any market (e.g., Amazon and Uber). Note that it is difficult to imagine each of these three types of digitization operating in isolation. Crittenden et al. (2018) have forcefully argued that digitization of customers, business, and communications processes have quickly converged to create digital disruption in business models and value networks.

Digital technology and the Internet have disrupted not only marketing but also the education system and modern workplace as well (Honea, Castro, & Peter, 2017). Since digital disruption is changing marketing practice, business schools have needed to change in parallel, reengineering, and adapting established approaches to business education to accommodate new content, new course delivery means, and new ways of training students ("Digital Disruption and the Future," 2017; Press, 2017; Useem, 2014). During this period of rapid evolution, higher education is shifting toward lifelong learning and instructors are interacting with generations that are markedly different from each other and earlier generations. Digital technology has transformed college students' attitudes, capabilities, and resources—which are critical to active learning and engagement (Bull et al., 2008). Generation Y (born 1981-1999) is the first cohort to have early and frequent exposure to technology, and Generation Z (born after 1999) is the first cohort to have Internet and smartphone access from a young age. These "digital millennials" (Ganesh & Sun, 2009) are comfortable using technology and new media to contribute, share, and consume content, as well as to search for information, participate in activities and play (Bolton et al., 2013). These social changes have accelerated the infusion of digital technology into course activities, and marketing faculty are adapting approaches to teaching and course design to accommodate the learning expectations of these "NetGen" students (Matulich, Papp, & Haytko, 2008). Hereafter, we use the term "NetGen" to refer to both Generation Y and Generation Z. Educators have adopted Web 2.0 applications into in-class pedagogies, such as rapid text-based polling and online group collaboration via course management tools or external collaboration suites such as Google Docs. Many assign projects that focus on social media applications and strategies. Some faculty even integrate third-party digital certifications in web analytics (e.g., Google Analytics Academy), inbound marketing (e.g., HubSpot Academy Inbound Certification), or social media (e.g., Hootsuite Certified Professional) into their courses (Staton, 2016).

Technology has also enabled a phenomenally sophisticated and interactive tool to enhance the student learning experience, the computer-based business simulation. Business simulations are a form of interactive digital training intended to provide students with realistic experiences. Whereas lectures are ideal for transferring foundational theoretical content, and the case method is a proven means of applying these fundamentals to hypothetical scenarios, simulations allow students to apply concepts and then, importantly, to see the results of their decisions. Simulations "take students as close to the edge of the real world as possible without actually falling in" (Kietzmann & Pitt, 2016, p. 71).

Emergent technologies, such as computer-based simulations, harness digital disruption with respect to both capturing market conditions disruptive to market processes and reflecting disruptive conditions inherent in the learning process itself. The aim of this issue of the *Journal of Marketing Education* is to bring together a variety of perspectives on how digital disruption can be embraced by educators and brought to the forefront of marketing education, and we thus contend that marketing simulations are especially effective pedagogical tools for this purpose. Our goal herein is to offer insights regarding how simulations enable the study, exploration and experience of marketplace disruptions on a digital, engaging, 24/7 platform that resonates with NetGen students.

Simulations are effective pedagogical tools in the era of digital disruption for two key reasons. First, they capture how digital disruption is transforming *market processes* that link the company, employees (or other intermediaries) and customers. The business cocreation triangle (in Figure 1), an adaptation of the services marketing triangle, depicts how technology infusion has transformed how actors participate in the value cocreation process by highlighting the influence of digitization on exchange processes between the firm, its customers, and its intermediaries (see Crittenden, Peterson, & Albaum, 2013; Parasuraman, 1996; Zeithaml, Bitner, & Gremler, 2013). Firms rely on customer relationship management, sales management and other systems to make internal processes and employees more efficient and effective—increasing the importance of marketing analytics (Wedel & Kannan, 2016). In addition, the firm and its employees (or other intermediaries) interact with customers via new media, social media, and other digitized interactions (Lamberton & Stephen, 2016).

Second, marketing simulations are effective because digital technology supports instructors and students in *collaborative learning processes* that reflect today's business environment. In the learning cocreation triangle (see Figure 1), we specify the stakeholders—Firm to Simulation, Intermediaries to Instructor, and Customers to Students—to highlight the applicability of this model to pedagogy and

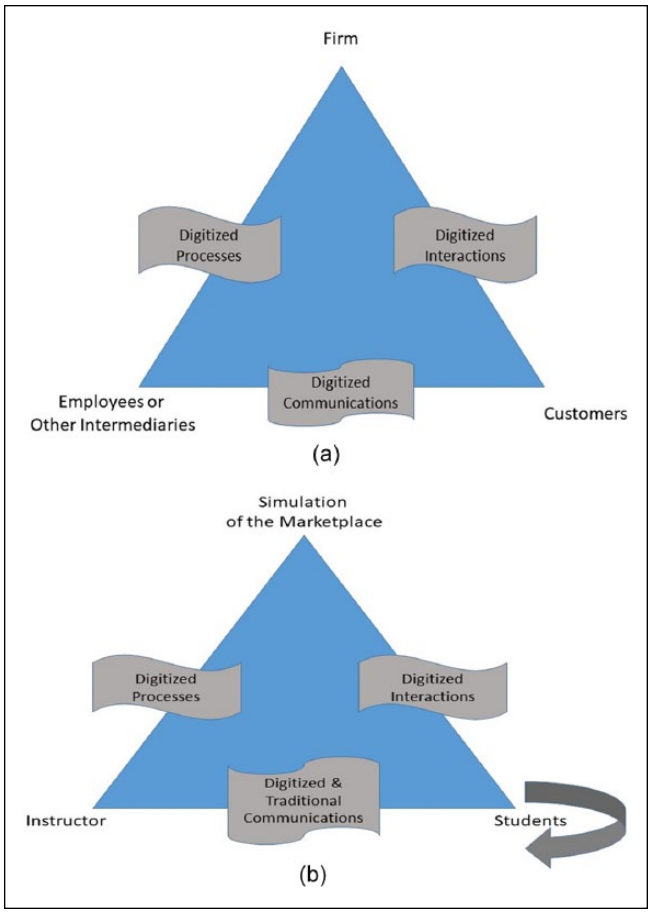

Figure 1. (a) Business cocreation triangle (adapted from Zeithaml et al. [2013] and Crittenden et al. [2013]) and (b) Learning cocreation triangle.
Note. Digitized processes includes customer relationship management systems, sales force and service management systems, business data and analytics and pricing systems, and so on. Digitized interactions include purchase and nonpurchase transactions, as well as information sharing. Digitized communications include new media channels (Twitter, Group chat) as well as traditional media channels.

learning. Technology connects the instructor with the simulation, providing him or her with tools and metrics to become more efficient and effective. Simulations can be customized to support a variety of educational foci, from product design and private label branding to sales management and e-tailing. The simulation also connects students with a realistic environment in which they may practice their skills. These environments are not necessarily static or stable—simulations can accommodate a variety of unanticipated market conditions, such as stockouts, weather delays, rapidly changing customer preferences, economic growth or decline, changes in regulatory policy, and many other real-world scenarios. Moreover, technology links the instructor and student with the simulation through physical, digital and social processes, thereby engaging them as collaborators in the learning experience.

In this article, we describe how marketing simulations harness digital disruption to enhance learning processes and outcomes and (ultimately) prepare students for their careers. The article focuses on comprehensive marketing simulations, which have more decision variables and incorporate authentic competition, rather than "play against the machine" games. It begins by describing simulations and how they capture digital disruption in the marketplace. Our description reflects our own experiences with the LINKS suite of simulations (www.LINKS-simulations.com), as well as the experiences of instructors and students with marketing simulations.[1] Then, we discuss how digital technology can be harnessed—via simulations—to improve students' learning experiences and outcomes. Next, the article identifies pedagogical opportunities and class activities that enhance learning experiences connected with digital disruption in business ecosystems. Our discussion applies to undergraduate, MBA, executive MBA, and programs targeted at other student groups (e.g., in-house corporate programs).

Marketing Simulations: Decisions and Dynamics

Teachers have been using games to simulate real-world scenarios and consequences of actions for arguably thousands of years. The principle of "learning by doing" is an experiential exercise characterized by first, an interactivity between the student and someone or something other than the teacher and, second, a degree of variability and uncertainty in the outcome of the student's activity (Burns & Gentry, 1992). The new knowledge that results from firsthand cause-and-effect experience is deeper and more indelible than that which is acquired by passive transmission through lectures, notes, or texts (Baker, Underwood, & Thakur, 2017; Kolb & Kolb, 2005). Modern business simulations harness computer and Internet technology to create "microworlds" (Romme, 2003; Xu & Yang, 2010) where students can be immersed in a realistic business environment without leaving the (proverbial) safety of their desks. Computing software processes thousands of calculations instantaneously, thereby creating the opportunity for extraordinarily complex simulated environments (Treen, Atanasova, Pitt, & Johnson, 2016).

Marketing simulations are defined as "internet-based, synthetic learning environments where decisions are made within a complex and dynamic setting, and where students experience real-time information and feedback" (Lovelace, Eggers, & Dyck, 2016, p. 101).

A marketing simulation represents a comprehensive and integrative business environment in which student teams actively manage firms that compete against each other. Students, acting as marketing managers, are confronted with an array of managerial decisions and dilemmas. Teams make decisions in an iterative manner, managing their firm on a month-by-month or quarter-by-quarter basis. They

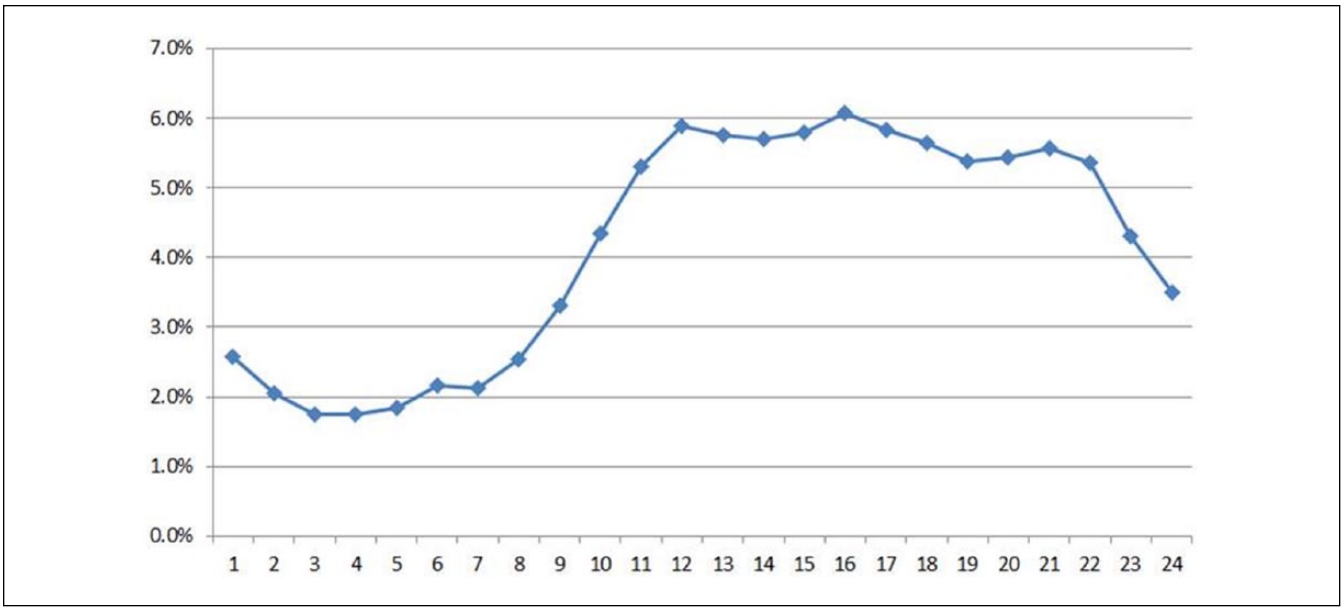

Figure 2. Distribution of LINKS simulation access over 24 hours (2018).

follow a repetitive cycle of analyzing a dynamic market, planning, making decisions about new or existing strategies, implementing tactics, and evaluating outcomes. The simulation provides students with market responses to their decisions via customer feedback, sales data across brands and channels, financial statements, marketing research, and other digitized communications. In a multifirm industry, students are responsible not only for their own firm's strategic decisions but additionally for anticipating and reacting to the competitive decisions of their peers (Brooks, Burson, & Rudd, 2006).

Marketing simulations create a highly personalized, customized, and immersive learning environment for each student. We use the word "immersive" intentionally; students are truly engaged in "around the clock" learning. Figure 2 describes how students access digital resources on the LINKS simulation website over time.[2] Students drive the learning experience—proactively seeking information and applying it to make decisions. To borrow a metaphor from Batko (2016), simulations take students from being passengers on the educational bus and put them behind the wheel.

Marketing simulations allow students to design and manage the customer journey over time, including all six dimensions of the customer experience: cognitive (e.g., product perceptions), emotional (e.g., satisfaction), behavioral (e.g., waiting time), sensory (service operations that deliver experience quality), and social responses of both employees and customers (Lemon & Verhoef, 2016; Verhoef et al., 2009). Student teams receive feedback on their firm's actions by observing customers' holistic and multidimensional responses to marketing variables as reflected in their firms' performance metrics and research reports (Grewal, Levy, & Kumar, 2009; Hamilton, 2016). They also observe the consequences of their firms' actions on customers' purchase and nonpurchase behavior (e.g., word-of-mouth). The rich and granular nature of simulation outputs allows students to see firsthand the effects of market disruption on customers and firms. Moreover, the students themselves are immersed in a multidimensional learning experience that is characterized by these same six factors.

Simulations provide an environment in which students can participate in digitized marketing processes. They can learn about and apply new tools used for sales force management and customer relationship management (e.g., Ahearne, Jones, Rapp, & Mathieu, 2008). Data and results are provided in spreadsheets, as well as in financial statements and reports, so that students are easily able to apply decision tools. Students typically use spreadsheets (such as Excel) to analyze market data, but some students may choose to use programming languages (such as R). This experience is especially valuable given that employers are now seeking students who have experience with business analytics. The simulation also provides key process metrics that are used in business, such as satisfaction levels and retention rates for both employees and customers. The following sections outline the marketing decisions that students make during the simulation, including decisions about traditional and digital marketing mix variables and participation in realistic, digitized, and dynamic market processes enabled by simulation.

Marketing Decisions

Marketing simulations encompass the breadth of decisions made by firms today, including price, promotion, product, supply

Table 1. Digitized Marketing Decisions and Processes.

Decisions	Marketing processes and strategic considerations
Marketing research	Qualitative analysis, quantitative and financial analysis, benchmarking, conjoint analysis, test marketing, business analytics
Pricing	Forecasting in the presence of competition and exogenous market factors, volatility and elasticity, consideration of nonmonetary costs, price perception versus reality, breakeven calculations
Supply chain and channel decisions	Channel depth (intermediaries vs. direct), channel width (distribution coverage), multichannel management, channel markup, shipping logistics, emergency procurement
Managing sales and service representatives	Compensation, allocation of resources across regions and outlets, product/service mix, human resource management, employee retention
Product decisions	Product design, configuration and specification, investments in R&D and technology, plant capacity management, failure rates, short-run versus long-run trade-offs, packaging concerns, segmentation and targeting, market viability
Service Design	Service quality levels, customer service center capacity management, service outsourcing, customer WTP for augmented services
Customer experience and customer relationship management	Customer satisfaction management, acquisition and retention, CLV calculation, B2C versus C2C needs
Communications	Marketing spending, mix allocation, positioning, promotions, customer responsiveness, timing
Exogenous factors	Economy, regulatory environment, patent laws, competitive behaviors
"Wildcards"	Global supply chain barriers, raw materials shortages, patent royalties, customer preference changes, new market opens, new capability or technology developed, "presidential directives," labor problems

Note. R&D = research and development; WTP = willingness to pay; CLV = customer lifetime value; B2C = business to consumer; C2C = consumer to consumer. This table shows some of the many options available in simulations.

chain, human resources, service operations, and technology decisions. There are sophisticated simulations available for different purposes, such as enterprise management, brand management, retailing, and service management. Some simulations are customizable to reflect different marketing contexts or instructional needs for various courses. Depending on the nature of the course, instructors may change region names to reflect different geographies or specify growth rates or price sensitivities for different market segments (e.g., household vs. major accounts). Simulations are an effective complement to lecturing or case discussions because they allow for the application of previously learned fundamentals thus bridging the gap between theory and practice (Batko, 2016). Faculty must choose the simulation and customizations that best match their course objectives and content.

> Think about how the course content (perhaps embodied by lecture and readings) ties back to the students' simulation experience. . . . Time [other] course experiences to correspond with what students are doing in the simulation. . . . Students are first engaged in identifying customer needs, selecting target markets from this information and launching new products. . . . I time my discussion on these topics . . . [to] provide insight and context into what to consider when making these decision. . . . It allows . . . the simulation to reinforce what we are discussing in the course. (Gwinner, 2013)

Table 1 describes the plethora of digitized marketing decisions and related processes that can be represented in a simulation. Each decision captures at least one element of disruption in the marketplace, along one of the three axes noted in the business cocreation triangle. Digitized interactions between the firm and customers are emphasized in decisions related to marketing research, test marketing, pricing, communications, product, and channel decisions. Digitized communications between employees and customers are evident in decisions about service design, marketing research, customer experience and relationship management, and communications. Digitized processes between the firm and intermediaries are highlighted in decisions regarding sales management and service representatives, channel management, pricing, labor problems, and explicate a number of exogenous/regulatory factors. That simulations enable learning about each of these marketing processes is not unique—each of these can be taught in other ways. What is unique to simulations, however, is the ability to enable learning about each of these marketing processes simultaneously and in concert. Additionally, what is inimitable about simulations is their ability to incorporate all of these processes and elements in a dynamic environment—so that students must discern when and how to apply their knowledge.

Dynamic Marketing Processes

A distinguishing feature of marketing simulations is that events unfold over time and students observe the consequences of their firm's actions. Students are likely to experience dynamic aspects of markets that they have not previously encountered in (static) textbook cases, and observe marketplace disruption

firsthand. For example, a firm (student team) might invest in a digital technology that radically alters its effectiveness or efficiency so that it can take actions that its competitors cannot. The critical advantage of simulations over other approaches is that they replicate dynamic and interactive aspects of the real business world that are otherwise difficult to mimic in a classroom environment (Vos & Brennan, 2010). Specifically,

- Business stewardship in the presence of vigilant competitors: Student teams must make marketing decisions after *anticipating* competitor actions or reactions over time.
- Balancing demand and supply: Student teams must manage demand and supply over time using the full repertoire of tools available to marketers, rather than meeting customer demand regardless of costs, or relying primarily on price.
- Managing interrelationships among business processes: Student teams must develop an effective method for allocating sales and/or service representatives to products and regions and for compensating them, thereby influencing sales generation and fulfillment.
- Making concrete decisions with imperfect information: Students encounter data (of all sorts) and must use it to make a variety of irreversible decisions by a given time, and must live with the consequences of those decisions in the future.
- Path dependency of decisions: Similarly, student teams' past decisions about investments in technology, price levels, or advertising levels may constrain or enable the firm's future strategic options. Product design changes have significant ramifications for operational and reputational costs.
- Price–quality trade-offs: Student teams must assess marketing opportunities and develop products for target markets, rather than making ad hoc decisions (such as offering a premium product in a market that turns out to be price sensitive).
- Selection and interpretation of market research: Student teams must use market research and analytics to inform decisions under uncertainty (rather than analyzing data sets that match well-defined problems).
- Interactions among marketing decision variables: Student teams must consider how advertising supports sales force, and/or how traditional and new media work together.

These managerial decisions and processes are especially important in markets characterized by digital disruption. For example, today's managers wrestle with dynamic pricing, complex interactions among media, and business analytics applied to big data.

Despite the dynamic and disruptive market environment captured by simulations, they are primarily intended to reinforce marketing principles—albeit manifest in complex ways. The prescriptions of marketing theory and business practice are programmed into the simulation's algorithms. In contrast to the case method, simulations are *not* conducive to out-of-the-box creativity or exploration beyond existing theory and principles embodied in the simulation (Woodham, 2017). For example, students cannot discover a new business model, such as collaborative consumption (Benoit, Baker, Bolton, Gruber, & Kandampully, 2017), within a simulation that does not represent triadic exchange. With this caveat, instructors can certainly use a simulation to highlight new topics surrounding digital disruption that have arisen in the business environment.

> LINKS recently introduced recycling and recovery in the supply chain . . . I used the simulation as a capstone assignment in the course . . . that was a great way to tie everything together. . . . The students were required to write a final paper for the course making the case for or against the value of sustainability. [They were able to use] the assigned readings, course discussions, and information from guest speakers as support, . . . as well as their own experience from making the actual decisions and seeing results. (Golicic, 2010)

This section has introduced computer-based marketing simulations as an effective tool for replicating market dynamics, including digital disruption, in the classroom. The next explores the benefits of using simulations with respect to student learning about digital disruption, including experiential techniques and motivating students to engage in the learning process.

Learning From Simulations: Experiential Benefits and Motivation

Simulations offer a number of benefits over alternative teaching techniques and tools. Passive knowledge-transfer activities, such as lectures and texts, are still appropriate for transmitting content to students. However, simulations allow students apply this knowledge in an experiential way. Learning from firsthand experience is far more powerful than learning from passive methods of instruction. Importantly, simulations are able to *model* the complex system of interrelated activities that comprise real-world business scenarios that other pedagogical approaches can only describe (Caruana, La Rocca, & Snehota, 2016). Modern computer-based simulations do so, furthermore, in an engaging, interconnected online ecosystem that is both accessible and familiar to today's NetGen learner. For these reasons, simulations are especially useful to reflecting the many complexities of digital disruption.

Moreover, simulations are longitudinal in nature, emulating a real-world management scenario for students—with the same sense of urgency. By comparison, case studies

focus on a selected marketing processes and decisions at a specific point in time (Tompson & Dass, 2000). They also conclude at the hypothetical—students are unable to see the results of their decisions, beyond what might be estimated by their professor. Simulations give direct, objective feedback on decision making and provide tangible data on market behaviors for students to analyze. Importantly, simulations allow students to experiment without actual market risk or financial consequence (Kietzmann & Pitt, 2016; Woodham, 2017), although students' firms are certainly rewarded or penalized in the simulated marketplace (Brooks et al., 2006).

Not surprisingly, simulations are popular across business schools. Faria (1998; in Mitchell, 2004) reports that simulations have been used at fully 97% of AACSB-Accredited schools; more than half of the surveyed business faculty had used a business simulation at some point. The main reason faculty incorporate simulations into their marketing classes is that the quasireal environment enables students to practice what they have learned, and experience the effects of their decision making on market outcomes (Gupta, Singh, & Verma, 2010).

Research has documented the benefits to students of using business simulations: increased student involvement, increased student enthusiasm and enjoyment for the class, improved performance on graded assignments, heightened perceived value of the learning experience, increased student competence with marketing fundamentals, and heightened instructor enthusiasm for course delivery (Cadotte & MacGuire, 2013; Myers, 2010). Furthermore, unlike both traditional digital tools and online course management technologies, students and faculty equally find social and interactive pedagogical tools such as simulations effective (Buzzard, Crittenden, Crittenden, & McCarty, 2011).

Batko (2016) identified three additional benefits that are especially relevant in a digital technology-infused environment. First, unlike traditional teaching, simulations create an environment for knowledge transfer by combining contextualized cognition, relevant application, and customized instantaneous instructional support. Second, they enable skill acquisition and development not only in the core context of the marketing course but also in the augmented context of the student's role that includes teamwork, soft skills, time management, strategic thinking, and quantitative analysis. Third, attitudinal and behavioral changes take place because the simulation challenges each student's existing frameworks for analyzing and deciding strategies, and expedites this process via repetitive cycles in a controlled and predictable software framework.

Simulations can be a particularly meaningful approach to general marketing strategy or marketing management classes (Mottner, 2009). However, they also can be customized to provide in-depth experiences relevant to digitized marketing processes, such as customer relationship management, marketing analytics, multichannel retailing, service management, or supply chain management. As students draw on simulation resources, they become active cocreators of a customized and personalized learning experience. This pedagogical approach is consistent with the Universal Design for Learning movement (Rose & Meyer, 2002), which advocates that a curriculum must be flexible and incorporate alternatives to make it appropriate for students of all different backgrounds, learning styles, and abilities in different learning contexts. Notably, the marketing simulation supports students as they learn to recognize essential cues and patterns, master skillful strategies for action and engage with learning—all tenets of the Universal Design for Learning movement. By interacting with a complex simulation, students learn to discern critical factors for marketplace success and to develop strategies for making decisions, learning from them, and improving. This observation is echoed in a student's "Advice to My Successor" memo:

> LINKS is based on real world information and circumstances. . . . Consider all numbers and data in the proper context relative to other data such as revenue, sales, expenses and net income of your firm. There is a plethora of research available to you . . . In fact, there may be too much. The trick is to only purchase the research studies that you need . . . Last, have fun and remember LINKS is just a game to help you learn. You aren't expected to be right in every decision, and through mistakes we often learn. (Krikorian, 2013)

Experiential Learning

Simulations enhance learning when students apply and practice knowledge acquired through lectures and case discussions (Cadotte, 2016). They integrate course content and bring it to life (Grewal, Motyka, & Levy, 2018). Online platforms can be leveraged for experiential learning (Mills & Treen, 2016), and computer simulations are robust vehicles for experiential and inductive learning (Baker et al., 2017; Burns & Gentry, 1992). Students learn from multiple sources—including their teammates—as they make decisions and receive feedback over time. Digital technology offers a variety of resources for students to learn more about different topics. Resources on the simulation website include exercises (e.g., on forecasting) and practice quizzes, tutorials (e.g., on pricing), FAQs, on demand market research, tools (e.g., for generating proformat financial statements), instructional videos, brief presentations on topics, and so forth.

Figure 3 shows the LINKS Simulations resources most used by students over the past few years. Students use traditional business resources and modern technologies in concert. For example, students especially like to generate proforma financial statements, a traditional business activity, to better understand the consequences of their proposed decisions. At the same time, use of newsletter-style briefings has given way to more interactive feedback mechanisms, including brief videos and interactive

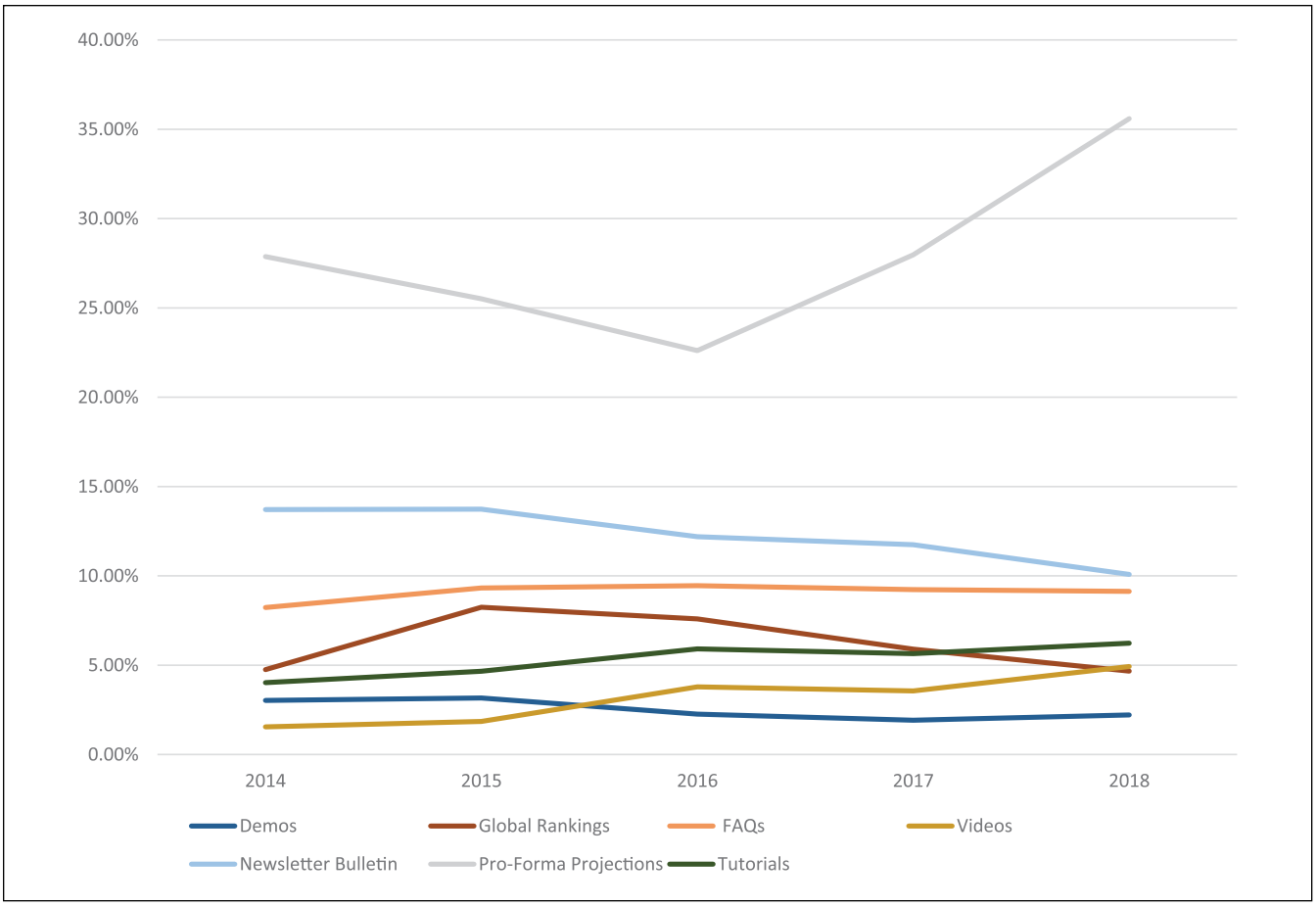

Figure 3. Chart of most used LINKS student resources over time.

tutorials, with which NetGen students are more familiar. In general, rich feedback from the simulation shows students how well they are progressing toward their goals. This feedback can increase their role clarity thereby improving their learning experiences and outcomes (Bolton & Saxena-Iyer, 2009). Thus, simulations illustrate each of the six core tenets of experiential learning theory (Kolb & Kolb, 2005, p. 194):

1. Learning is best conceived as a process, not in terms of outcomes. Simulations are a longitudinal process that emphasizes analysis and planning between rounds over final results.
2. All learning is relearning. Simulations are unique, as a pedagogical tool, in that students are able to see the results of their decisions, and measure what was expected against what actually happened.
3. Learning requires the resolution of conflicts. Reconciling expected versus actual performance, identifying reasons for discrepancies and adjusting strategies is the nature of each round of game-play.
4. Learning is a holistic process of adaptation to the world and involves the integrated functioning of the total person. Working in teams, students perceive incoming information, think about how existing knowledge and skills map onto that information, perform a role as one part of a larger firm, and thus deal with interpersonal dynamics in addition to intellectual ones.
5. Learning results from the synergetic transactions between the person and the environment. Simulations encourage students to assimilate new experiences into their existing knowledgebase, and vice versa.
6. Learning is the process of creating knowledge. Where lecturing offers a transmission of knowledge but not its creation, simulations enable an active method of learning whereby new knowledge is created through the planning, execution, and feedback loop.

These tenets are especially important because digital technology has created large volumes of high-velocity data and information which must be transformed into useful knowledge through active cocreation with others.

Motivating Students to Learn

Simulations create an environment that motivates students to engage in the learning process. There are four distinctive characteristics of today's NetGen student, each of which suggests that simulations are not only appropriate but also necessary for modern marketing education (Ganesh & Sun, 2009). First, today's students are naturally comfortable with online teaching and communication. Computer-based simulations are not foreign to today's students as it would have been for previous generations. Interacting with simulations seems natural because they grew up in high-technology environments. Second, NetGen students are willing and able to communicate and interact mediated by technology. They are accustomed to instant messaging, social networks, online commenting and replying to discussion threads, and formation of online communities. Hence, the online collaboration necessary for simulations is a natural extension of existing norms of behavior. Third, NetGen students prefer experience-oriented learning over passive learning. Simulations are immersive and experiential, and they apply the principles of gamification to inductive learning (Robson, Plangger, Kietzmann, McCarthy, & Pitt, 2015). Finally, NetGen students need time to "digest" their learning and simulations accommodate this need. Although the decision making is concrete and intense, the execution of rounds is quite flexible. Rounds can be scheduled many hours or days apart, so students have more than enough time to process the previous results, reconcile intended and actual market performance, and discern how to adapt strategies for subsequent rounds.

Studies report that students prefer learning activities that are enjoyable, challenging, and transfer to real-world business settings (D'Aloisio, 2006; Karns, 2005); marketing simulations provide these sorts of activities. Many instructors report that students enjoy competitive simulations, such as the comment below:

> When determining strategy, teams can design their products to fit that strategy. For example, are they positioning themselves as the Dell or Apple of the . . . industry? . . . [Students look] in more depth at the markets to determine which product-quality "level" and corresponding pricing structure customers wanted. . . . [They can] incorporate sustainability and the value consumers are willing to pay for sustainability in the packaging decision (The students loved this). (Blythe, 2010)

Using Simulations to Capture and Reflect Disruption

Marketing simulations offer an educational experience that is uniquely able to prepare students for the complexities of the business lives they are training to undertake (Walker et al., 2009). They offer students a small taste of the high-pressure and occasional instability of issues facing today's marketing managers (Wolfe & Luethge, 2003). In addition, simulations reflect communications digitization taking place among firms and customers, including social and new media. To augment this feature, instructors can use social media and new media as part of the simulation experience.

> In the real world, the popular press plays a significant role on consumer perceptions of each component of the marketing mix. In turn, corporate strategy has to take into account the influences of this press when considering both short and long term strategies. Therefore, I now use Twitter . . . Scenarios about which I tweet include possible new products that could come to market (e.g., access to a third private-label product), new regions that could be opening up, weather delays regarding shipments, raw material shortages causing cost increase, etc. . . . Twitter allows you to divulge this information in an efficient and timely manner to students . . . before any of these curveballs should be implemented in the simulation. . . . As the professor, you can also provide fake scenarios that will never come to fruition. This [tactic] allows you to evaluate if and how students create contingency plans. . . . Manage this process very carefully [so] as not to mislead student groups, but a fair amount of media conjecture is demonstrated on any 24 hour news source accessible in today's society. Corporations still have to decide how to interpret this information and manage it. . . . Using Twitter in the class also provides a useful avenue to keep students connected to current events. (Huggins, 2011)

In this way, marketing educators can engage students with the different kinds of digital interactions that take place in today's world between the customer and the company, among competing firms (that can signal to each other), and among customers themselves. This issue is important because today's marketplace is physically complex and embedded in social processes, as well as characterized by high density, digital information. Students, as future managers within complex business ecosystems, must have the resources and capabilities to manage physical, social, and digital resources to cocreate value (Frow, McColl-Kennedy, & Payne, 2016). They must understand the roles that firms, employees, and customers play in the ecosystem, as well as master business analytics (Barton & Court, 2012). Bolton et al. (2018) have discussed how the intersection of physical, social, and digital realms can blur participants' roles within the ecosystem. In-role and extra-role behaviors can be considered as a form of codified and tacit knowledge, where codified knowledge refers to "knowledge that is transmittable in formal, systematic language" and tacit knowledge is knowledge that is "difficult to state explicitly (on) how to perform the function" (Chesbrough & Spohrer, 2006, p. 38). A simulation provides students with the opportunity to navigate this complex environment, apply codified knowledge, acquire tacit knowledge, and learn to execute successful strategies.

Marketing simulations allow students to understand how events unfold over time and highlight the importance of the timing of firm actions. Month-by-month or quarter-by-quarter,

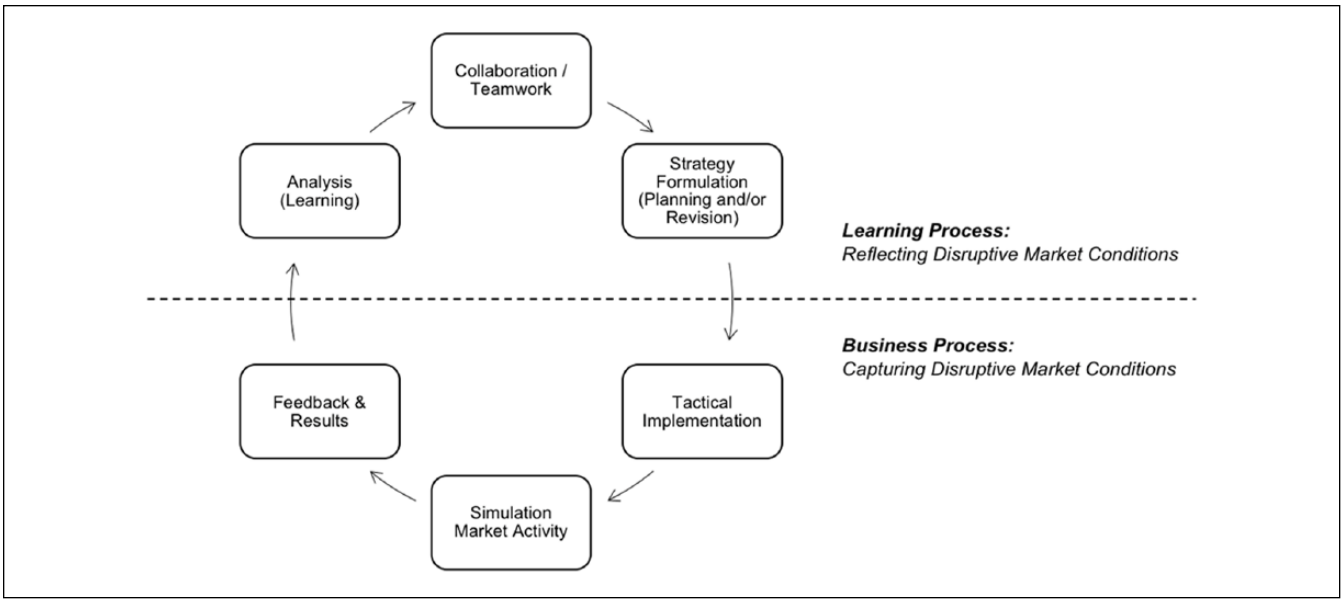

Figure 4. Marketplace disruption captured and reflected by simulation games.

the marketplace sets the pace of decision making. Student teams must generate ideas quickly and innovate rapidly. For example, a pioneering firm that (perhaps) invests early in market research and technology will perform differently than a follower firm that (perhaps) uses a penetration pricing strategy to increase market share and lower prices through experience curve effects. Or, media spending can accelerate customers' awareness and knowledge of brands, thereby building brand equity and insulating the firm from competitors. At the same time, a disruptive event—such as a new high-quality product or a new market segment—can completely change a firm's position in the marketplace and the effectiveness of its strategies (Bolton, 2019).

Marketing simulations mirror the fast-moving nature of the marketplace which gives a certain urgency and importance to team decisions. This business landscape may (initially) seem overwhelming to students, due to the complexity of physical, digital, and social environment and the multitude of potential decisions available to the firm. For each round of the simulation, students follow a six-stage sequence of activity: strategy formulation (initial planning and/or revisions based on new market information), tactical implementation (programming decisions into the simulator), simulation of market activity (performed by software algorithms), feedback and results (output generated by software), analysis of these results and reconciling observed with expected performance outcomes, and finally collaboration and teamwork in both analysis and planning for future decisions. This process repeats, as the team returns to strategy (re)formulation after their analyses. We posit that this cycle of activities in the marketing simulation harnesses market disruption in two ways (see Figure 4). First, simulations capture market conditions disruptive to *market processes*, and second, they reflect disruptive market conditions inherent in the *learning process* itself.

Business Processes: Capturing Disruptive Market Conditions

"The context in which today's students will make choices and compose lives is one of disruption rather than certainty, and of interdependence rather than insularity" (Association of American Colleges and Universities, 2007). Business simulations, as discussed at length above, are particularly effective and meaningful because of their ability to provide elements of realism about operating a business. The market environments created within simulations are often dynamic, competitive and uncertain—characteristics that certainly reflect the reality of today's marketplace (Wolfe & Luethge, 2003). Simulations require that students adapt to a constantly changing decision-making environment (Baker et al., 2017; Hall & Ko, 2006).

Simulations capture disruptive market conditions in the three stages of activity where students engage with the simulation software directly: implementing tactical decisions, observing market behaviors, and receiving the feedback and results of the round. Here, students are engaged in market-oriented, externally facing behaviors. They put their ideas out into the world to see what happens. Students make decisions to the best of their abilities, but they cannot control how customers or markets will behave or what decisions *other* student teams will make (Cadotte & MacGuire, 2013), all of which affect their team's results. A plethora of disruptive outcomes can occur as a result of competitive

positioning and strategies through any number of marketing processes, and students realize that the world did not behave as they expected (Cadotte, 2016). The simulation software itself can include external shocks and unforeseen events to the market system (Lovelace et al., 2016). Unanticipated "wildcard" conditions may include stockouts, weather delays, rapidly changing customer preferences, economic growth or decline, changes in regulatory policy, market openings or closings, new technological developments, and many other real-world scenarios.

Simulations are an effective way to incorporate disruptive marketplace activities into the classroom learning environment. As students make decisions and implement tactics based on the environment in which they find themselves, the environment changes as a result of those decisions (Grewal et al., 2018). Similar to the real world, some element or aspect of the market does not respond as students intend, and it is a critical part of the learning process to unearth why and how actual market performance differed from what was expected (Cadotte, 2016). The process of decision making and implementation over simulation rounds is essentially a process of testing what they perceive to be true by applying the fundamentals of what they have learned to date. Often, these tests do not turn out as expected, and the instability and perceived unpredictability of the market reflects the disruption inherent in today's business processes.

Learning Processes: Reflecting Disruptive Market Conditions

Simulations also reflect disruptive market conditions in the three stages where students engage with information and each other, more than the software itself: analysis of the software's simulated market outputs, (re)formulating strategies and plans for the next round of game-play, and collaboratively working with other members of their teams. Here, students are engaged in intellectually oriented, internally facing behaviors. They interpret and evaluate the information available about their circumstances and then make decisions. As the business world around them shifts and destabilizes, students must persevere by applying their knowledge and skills to adapt to these changing market conditions (Cadotte & MacGuire, 2013). Simulations afford a complex and integrative system of business activities that demands learning by engagement and interaction (Caruana et al., 2016), highlighting the disruptive nature of trying to formulate strategy in the face of uncertainty.

Simulations are notably effective in their ability to showcase that there are always multiple approaches to solving a given problem, and the consequences of each of these possible paths must be weighed against current and future market unpredictability (Hilton, 2006). Perseverance is required for creativity in problem solving and strategy formation, and in the face of these market uncertainties students must be able to function competently with the skills that will be required of them as future marketers: communication skills, marketing fundamentals, teamwork, collaborative problem solving, sensitivities of interpersonal working relationships, within-group conflicts, and so forth (Brooks et al., 2006; Ganesh & Sun, 2009; Honea et al., 2017; Lovelace et al., 2016; Schlee & Karns, 2017; Treen et al., 2016).

The iterative cycle between business and learning processes—and between external marketplace disruption and internal workplace disruption—uniquely encourages students to focus on the impact of their own decision making, especially with respect to strategic adjustment based on the results of previous decisions. This phenomenon is an exemplar of the metacognitive learning cycle (cf. Blank, 2000; Woodham, 2017): (a) concept introduction, (b) concept application, (c) concept assessment, and (d) concept exploration. Students first *integrate* and connect new incoming information with existing information, and then *elaborate* to future opportunities, consequences, threats, alternatives, and possibilities (Zantow, Knowlton, & Sharp, 2005). While working out multifarious solutions to problems is certainly not unique to simulations, what is unique to simulations is the student experience of closing this loop and subsequently repeating it, leading to transformational learning opportunities and outcomes.

Pedagogical Opportunities and Class Execution

In this section, we describe some recommended approaches to adopting and implementing a simulation in the classroom, faculty, and student roles, how students are motivated to learn through competitive simulations, and how digital disruption influences the timing of marketing actions. Despite healthy conversations about simulations in the educational literature, there is a notable lack of prescriptive advice on how to incorporate them into the marketing class (Brooks et al., 2006). Instructors face a number of important choices in selecting and setting up the simulation game that have notable influence on the student—and instructor—experience (Grewal et al., 2018). These decisions include, but are not limited to, selecting a simulation, evaluation, industry and team size, introducing and concluding the simulation, and the instructor's role.

Adopting a Simulation

There are a variety of possible options for simulation software packages available to marketing faculty. The three leading marketing simulations are Stratx Markstrat, Marketplace Live, and LINKS simulations (Treen et al., 2016). All simulations require a working proficiency in basic computing software including Internet browsers, social communications platforms, spreadsheets, and other basic

analysis tools. Instructors sometimes embed the simulation in courseware platforms, such as Blackboard, to encourage students to collaborate and access other instructional materials. However, a courseware platform is not necessary. Today's students are comfortable with Web 2.0 tools (such as Google Docs and Group chat), so they often adopt them for team communication and interaction online.

Evaluation and Grading

Faculty must also decide how to grade the simulation as a course component. Marketing simulations provide a team grade that reflects firm performance. The grade usually reflects multiple key performance indicators, such as the ratio of net income to sales, forecasting accuracy, inventory turnover, customer churn, and so forth. In our experience, students are frequently concerned that their firm's performance metrics are not an accurate reflection of their learning, but performance is not directly linked to learning (Batko, 2016). Some teams experiment and take risks (because the simulation environment is "safe") that lead to learning—but they do not pay off in terms of profitability or market share. Similar newsworthy failures take place in the real business world. For these reasons, we recommend that *objective* performance should contribute about 20% of a student's grade for the simulation. Many instructors include midevent and postevent assignments such as brief quizzes and reflection memos to supplement the within-simulation performance grade. Team peer evaluations (up to 20% of a student's grade for the simulation) are also recommended to remind students that they are accountable to each other, just like the real world (Lamont, 2001).

Industry and Team Size

An important consideration is how many teams should compete in a given industry, and what the size of the teams should be. Group dynamics are critical to ensuring that teams function well and handle conflict appropriately if and when necessary. As shown in Figure 5, we have seen considerable variability in how LINKS instructors configure classes. However, most instructors use teams of four or five students, with six to eight firms in an industry. The primary reason (for both) is that these sizes make it possible to assess the performance of an individual student within a team and a specific firm within a marketplace.

A recent study of team performance in marketing simulations across 2,633 teams suggests that overall performance increases as players are added up to five members, but performance decreases for teams of six or more (Treen et al., 2016). What is ultimately critical is that student teams competing against each other are of equal size (Batko, 2016). It is also important to consider the composition of groups when forming groups. Fenwick and Neal (2001), for example, found that teams of mixed genders outperformed all-male or all-female teams in marketing simulations. Teams should be balanced as well with respect to academic skills and, if possible, major (Lamont, 2001).

> The [students] find it important to identify the specific skill sets each has for the various performance areas [e.g., forecasting or pricing or online experiments] . . . I've found the teams that perform the best are those who share responsibilities but come together to make informed decision through sharing their ideas and suggestions for each round. (Woody, 2010)

Introducing and Concluding the Simulation

Usually, instructors assign the students to read the manual, use at least 15 to 20 minutes of class time to introduce the simulation, and then teams move into breakout sessions to make their first set of decisions. An effective way to introduce students to business simulations is to liken the experience to how pilots are trained using airplane simulations. Students might be familiar with the movie, "Miracle on the Hudson," which depicts how Captain "Sully" Sullenberger landed an Airbus A320 on the Hudson River in 2009, saving all passengers. When the engines lost power due to a flock of birds, Sullenberger quickly realized that his plane would not be able to reach a nearby airport and acted decisively (McFadden, 2009). A key feature of this incident (and other incidents demonstrating pilot expertise) is that extensive training on simulations helps people quickly recognize essential cues and patterns and learn to execute successful strategies in challenging environments. In the same way, students can train to detect cues and patterns and successfully navigate in markets characterized by digital disruption.

It is useful to hold a structured event at the end of the simulation experience to help students reflect on what they have learned and what they might do differently in the future. This activity should encourage students to look forward, rather than backward. Instructors have used different activities, including individual-based "Advice to My Successor" memos, Marketing Plans for each firm, and group presentations, such as the following:

> Prepare a 15 minute or 20-minute presentation answering two questions: (1) "What was your team's strategy and how did you execute it?" (2) . . . "What was your [firm's] most difficult decision . . . your easiest decision" [or] "If you could change one thing, what would it be?" (Stephens, 2014)

The simulation debriefing session is a critical time for students to actively reflect on their learning experience, both individually and as a group (Batko, 2016). While the main structured event is a full class period group discussion (Lovelace et al., 2016), this can be augmented with individual assignments such as guided reflection memos that reinforce managerial takeaways and structured brief quizzes that

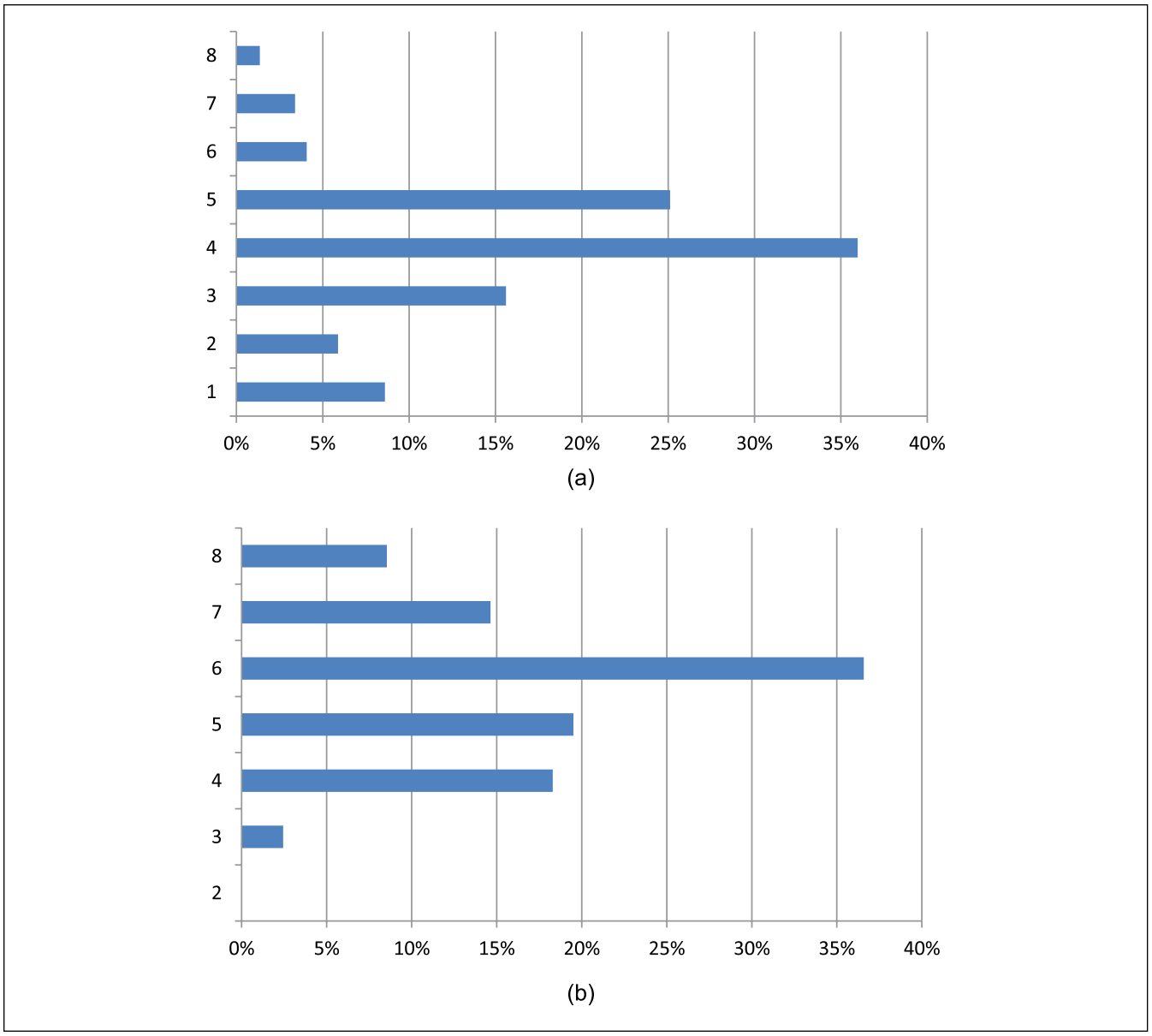

Figure 5. (a) Number of students per team in LINKS industries (April 2018) and (b) Number of firms in LINKS industries (April 2018).
Note. LINKS Simulations industries accommodate between 2 and 8 firms per industry. Instructors with larger classes use multiple industries (not necessarily with the same number of firms in each industry).

can be used to measure assurance of learning objectives (Vos & Brennan, 2010).

Faculty Role in the Simulation

Beyond guiding the introductory and debriefing sessions, modern simulations are so highly automated that instructors do not need to be "hands-on" in guiding the mechanics of game-play through each round. Rather, the instructor can focus on student learning. The system provides a variety of learning aids, notifies students when decisions are due and results are available. Since the instructor is not involved in administrative tasks, technology does not interfere with faculty–student interactions or hinder rapport-building (Giebelhausen, Robinson, Sirianni, & Brady, 2014). The instructor receives reports concerning firm performance and marketplace outcomes, as well as student learning metrics (such as number of decision changes and research studies ordered). These metrics report actual learning, rather than perceived learning. For example, the percentage improvement in forecasting sales is an objective measure of the achievement of a specific learning goal (Bacon, 2016). The

instructor uses his or her simulation dashboard and reports to monitor student/team progress and access teaching resources. Hence, students can be encouraged to view the instructor more as a "coach" there to help them learn and succeed. The coach helps students understand the market, competitive dynamics, available strategic and tactical options, and tries to guide students to forecasting the implications of their various choices prior to making them. Instructors can choose whether to introduce each round by reflecting on industry performance overall with the entire class, or whether to simply release results and let students work through rounds autonomously.

Regardless of whether an instructor teaches in a traditional classroom, a "flipped classroom," a learning lab or an online class, it is always useful to briefly meet with each student team near the beginning of the simulation. This meeting provides an early opportunity to ensure that each team is "on track," to challenge their assumptions and rationale for decision making, to connect their actions to performance. This meeting is especially important in markets characterized by digital disruption, where there may be considerable "noise" that obscures market processes. For example, students might claim that "digital advertising doesn't work in this market." They may not realize that advertising elasticities are usually about 0.2 (compared with price elasticities of −2.0)—so the effect of digital advertising on sales will not be detected unless the advertising budget is (at least) doubled. Hence, a targeted experiment is a better way to assess advertising effectiveness.

A final note on faculty involvement relates to the simulation technology specifically. Despite their comfort with technology, students sometimes expect the instructor to offer "tech support" during the simulation experience (Buzzard et al., 2011). In our experience, the most effective instructors distinguish between technical and instructional support. In response to questions about the mechanics of the simulation, the instructor should guide the student to online support tools, such as tutorials, videos and FAQs—rather than providing "the answer." This strategy will guide students toward lifelong learning practices, by accessing physical (e.g., textbook and business press), digital (e.g., videos and online tutorials), and social (e.g., experts and peers) resources. In response to questions about the application of course principles, the instructor should offer support through formal, in-class briefings. These briefings can be very short, approximately 5 minutes; they might introduce a research report that helps identify marketing opportunities or present a graph that show firm progress on key metrics. Informal just-in-time instruction can point students toward fact-based analysis of trade-offs (e.g., sketching out an importance performance chart)—where the simulation exemplifies real-world challenges.

Conclusion

Simulations harness the multitude of ways digital disruption is transforming market processes that link the company, internal intermediaries and customers. Specifically, by capturing market conditions disruptive to market processes and reflecting disruptive market conditions inherent in the learning process itself, simulations bring three unique facets of digital disruption to the fore. Interactions between the firm and its internal stakeholders and employees (both the students and the simulated employees) highlight the *process digitization* characteristic of digital disruption. Student decisions about customer experience, relationship management, market research, and promotions all highlight the *communications digitization* intrinsic to digital disruption. Finally, the abundance of interactions between the firm and the customer related to the development of marketing mix strategies in the simulation epitomize the *customer digitization* at the core of digital disruption.

Digitized interactions between the firm and customers are emphasized in decisions related to marketing research, test marketing, pricing, communications, product, and channel decisions. Digitized communications between employees and customers are evident in. Digitized processes between the firm and intermediaries are highlighted in decisions regarding sales management and service representatives, channel management, pricing, labor problems, and explicate a number of exogenous/regulatory factors. That simulations enable learning about each of these marketing processes is not unique—each of these can be taught in other ways. What is unique to simulations, however, is the ability to enable learning about each of these marketing processes simultaneously and in concert.

The business cocreation triangle (in Figure 1), an adaptation of the services marketing triangle, depicts how technology infusion has transformed how actors participate in the value cocreation process by highlighting the influence of digitization on exchange processes between the firm, its customers, and its intermediaries (see Crittenden et al., 2013; Parasuraman, 1996; Zeithaml et al., 2013). Firms rely on customer relationship management, sales management, and other systems to make internal processes and employees more efficient and effective—increasing the importance of marketing analytics (Wedel & Kannan, 2016). In addition, the firm and its employees (or other intermediaries) interact with customers via new media, social media, and other digitized interactions (Lamberton & Stephen, 2016).

We close this article by emphasizing three best practices recommended by many experienced marketing educators that are especially relevant in environments characterized by digital disruption, and that highlight digitized processes in the learning cocreation triangle (Figure 1) specifically. First, use just-in-time instruction to bring digital disruption into the classroom, such as short briefings or tutorials that help students discern potential strategies and solutions. Working with students round-by-round will not only help students work through results and strategic decisions as they arise but also will encourage continued engagement. Just-in-time

instruction exemplifies the digitized communications linkage between the instructor and students highlighted in the learning cocreation triangle.

Second, embed structured tasks within the simulation experience, such as plans and/or presentations that focus on a specific managerial decision made under uncertainty. Given the intentionally abundant amount of information and demands for time and attention, students can start to overwhelm as the simulation progresses. Focusing them on specific decisions in midst of the frenzied marketplace environment can help keep students grounded and motivated. Structuring tasks within the simulation game-play highlights the processes linking the simulation software and the role of the instructor in creating a coproduced environment for student learning.

Third, design the event to be a high-touch and practice continuous coaching, so that students integrate the physical, digital, and social realms of the business environment and the learning environment. Socratic approaches to teaching are effective during game-play; while lectures are appropriate for introducing decision rounds, in-game coaching is best seen as an opportunity to guide students to solving problems rather than giving them the answers. By highlighting problems and encouraging student insights, the instructor can magnify the iterative interactions and between the students and the simulation software thus maximizing learning opportunities.

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Notes

1. Randall G. Chapman is the LINKS Simulations designer (see www.LINKS-simulations.com). Ruth N. Bolton is a coauthor of the suite of LINKS services simulations. The faculty and student quotations in this article are excerpts from *The Professor's Column*, a publication posted on the public instructor dashboard of the LINKS Simulations website. One or more professors write each issue, focusing on a specific topic related to how he or she uses simulations in teaching, and all have taught with a simulation for multiple years. There are more than 30 issues of *The Professor's Column*, each 500 to 1,000 words (available at http://links-simulations.com/PHP/ProfessorColumns.php). Quotations were selected for their relevance to the topic of digital disruption.
2. A straight line at (roughly) 4% would imply access is evenly distributed across 24 hours. LINKS simulations are used all over the world—that is, in every time zone. The slightly lower values on the left-hand side reflect the fact that some (but not all) North American students take time to sleep!

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