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## Analytics Capability in Marketing Education: A Practice-Informed Model

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# Analytics Capability in Marketing Education: A Practice-Informed Model

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## Abstract

As marketing continues to be transformed by technology and the explosion of big data, academic research has identified a significant need for analytics skills in marketing education. However, it is unclear whether current curriculum approaches to marketing analytics equip students with the skills employers need and prepare them effectively for data-driven marketing roles. This study identifies the knowledge and skills marketing graduates require for analytics practice to bridge the theory-practice gap and increase students' employability. Our research reveals that a blend of knowledge, soft and technical skills is needed, and that the ability to communicate insights from data to stakeholders is critical. We offer a practice-informed model which demonstrates that conceptual knowledge, technical skills, tools skills and soft skills are required to develop holistic analytics capability for marketing practice. Actionable takeaways for how educators can embed holistic analytics teaching in marketing education are also provided.

## Keywords

marketing education, data analysis skills, digital marketing analytics, analytics education, marketing practice, business schools, theory-practice gap

The growth of digital technologies in the 21st century has had a profound impact on the volume, velocity and variety of data available to organizations for marketing decision making (Langan et al., 2019; Nunan & Di Domenico, 2019). Data-driven marketing has emerged as a critical issue, particularly in the context of new types of customer data emerging from digital media and online consumer information exchanges (Langan et al., 2019; Walker & Moran, 2019; Wymbs, 2016). The challenge for organizations operating in the digital economy is how to make sense of this overwhelming amount of data and transform it into actionable insights to improve marketing performance (Finch et al., 2013; Liu & Burns, 2018; Mintu-Wimsatt & Lozada, 2018). As a consequence, the demand for data skills has grown significantly, with the skills gap in contemporary marketing primarily driven by analytics, digital marketing and marketing technology (Cowley et al., 2021; General Assembly, 2020; Institute of Data & Marketing, 2019; Spiller & Tuten, 2019).

Universities are increasingly expected to address skills gaps within industry, and prepare its students for employment (Schlee & Karns, 2017; Ye et al., 2017). Within the marketing discipline, the ability of higher education to equip graduates with the right skills continues to be questioned (Harrigan & Hulbert, 2011; Langan et al., 2019; McArthur et al., 2017). Industry's shift to data-driven marketing has seen a proliferation of new courses on analytics, and researchers generally agree that it should be taught as part of the marketing curriculum (LeClair, 2018; Liu & Burns, 2018). There

is less consensus of what exactly analytics in marketing entails and whether business schools' current approach meets the requirements of the marketplace (Langan et al., 2019; LeClair, 2018; Nunan & Di Domenico, 2019).

Against this backdrop, our study seeks to explore the knowledge and skills marketing graduates require for analytics practice, in order to bridge the theory-practice gap between marketing education and industry needs and increase students' employability. It extends previous research that has taken a practice-informed approach to marketing education (Finch et al., 2013; Harrigan & Hulbert, 2011), while contributing to recent debates about the role of business schools in developing work-ready graduates (Rohm et al., 2021). This study also provides recommendations to marketing educators on how to effectively integrate analytics teaching into their curriculum.

This article first examines the theory-practice gap in marketing education before defining its use of capability for the purpose of this study. It then provides key definitions of analytics in marketing theory and sets out the scope of this research, before reviewing how the subject has been embedded in

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marketing education. Our article then identifies, through a directed content analysis of studies that examine practitioners' views, the proficiencies marketing graduates should develop to succeed in contemporary analytics practice. Findings are discussed and organized into a practice-informed model highlighting the most valuable knowledge and skills for digital marketing analytics capability. Wider implications and tensions of a shift to a practice-informed approach to marketing education are subsequently summarized.

## Literature Review

### *The Theory-Practice Gap in Marketing Education*

There is an increasing consensus that marketing practitioners are important stakeholders in marketing education, and that a major role for universities is to equip graduates with the right knowledge and skills for employment (Rhew et al., 2019; Ye et al., 2017). The divide between what is taught in the curriculum and marketplace requirements has long been observed in the literature (Duffy & Ney, 2015; McArthur et al., 2017), with some calling for a shift toward a pracademic paradigm where practice and skill development is prioritized over theories (McNatt et al., 2010). Scholars agree that conceptual knowledge, which involves understanding the key concepts and theories of a subject, is less relevant in practice, particularly in entry-level marketing roles where technical and soft skills are a priority for employers (Schlee & Harich, 2010; Schlee & Karns, 2017; Staton, 2016).

The theory-practice gap has been further exacerbated by the advent of digital technology, particularly in the areas of marketing research (Nunan & Di Domenico, 2019; Vriens et al., 2019) and marketing communications (Batra & Keller, 2016; Kerr & Kelly, 2017; Maddox et al., 2018). Digital skills are now required in most jobs, with digital marketing and analytics as key growth sectors lacking qualified candidates (Langan et al., 2019; Leeftang et al., 2014; Rohm et al., 2021). For business schools to remain relevant to both their students and the needs of industry, it is thus important to maintain the link between marketing academia and practice (Nunan & Di Domenico, 2019; Rohm et al., 2019). A key barrier to bridging the theory-practice gap has been the emphasis of academic curricula on conceptual knowledge over skills as the former is considered to have more longevity (Crittenden & Crittenden, 2015). Researchers increasingly contend that, given the accelerating digital skills gap, disciplines should shift to a digital orientation, with a digital-first curriculum designed around practice (Langan et al., 2019; Rohm et al., 2019) and incorporating live project-based learning (Rohm et al., 2021). Within marketing, there is an increasing demand for analysts due to the exponential growth of big data (Houghton et al., 2018) leading some to conclude that analytics is now essential to marketing practice and consequently must be part of the curriculum (LeClair, 2018).

To identify how marketing education can bridge the theory-practice gap in analytics and meet current marketplace requirements for students with analytics capability, it is important to first clarify the terms capability, knowledge, and skills. In this article, we use capability to refer to a set of knowledge and skills required in the context of graduate employability (Spencer et al., 2012). Unlike competence, which in this view is conceptualized as a fixed set of knowledge and skills to perform current and routine tasks, capability is the ability to apply these in new and unfamiliar circumstances and develop further capacity in the future (Lizzio & Wilson, 2004; Stephenson, 1998). Researchers increasingly agree that this adaptability is critical to future-proofing students given the rapid pace of technological change and the fast-changing marketing environment (Crittenden & Crittenden, 2015; Rohm et al., 2021). We use the term *knowledge* to represent conceptual knowledge, that is, the learning of the theoretical base of a subject that appears in the respective textbooks (e.g., principles of marketing) and tends to have a long life cycle (Schlee & Harich, 2010; Ye et al., 2017). Despite its common usage, the notion of skills lacks a coherent and consistent definition among researchers. In this study, we initially conceptualize skills as comprising of two subcategories: (1) soft skills (sometimes called meta skills), which include higher order thinking skills (e.g., critical thinking, problem solving), communication and interpersonal skills, and (2) technical skills (sometimes called hard skills), the ability to carry out a technical task, which includes learning specific types of software, programming languages, and/or tools (Rohm et al., 2021; Schlee & Harich, 2010; Schlee & Karns, 2017).

Researchers have attempted to align marketing education more closely with industry needs in several ways. Some have suggested curriculum improvements based on key knowledge and skills required by practitioners (Finch et al., 2013; Harrigan & Hulbert, 2011), while others have proposed to more fundamentally change how the subject is taught to better reflect real-world marketing trends (Rohm et al., 2019; Wymbs, 2011). Another solution is to integrate marketing practice through experiential and project-based learning (Billore, 2021; Rohm et al., 2021; Ye et al., 2017). Research methods to gather industry requirements are varied and include qualitative interviews and focus groups with practitioners (Harrigan & Hulbert, 2011; Royle & Laing, 2014), while quantitative approaches consist of surveys of practitioners (Finch et al., 2013) and text mining and content analysis of marketing job adverts (Liu & Burns, 2018; McArthur et al., 2017; Schlee & Harich, 2010; Schlee & Karns, 2017). Findings suggest that priority areas for conceptual knowledge include measurement and strategic marketing, while soft skills, such as communication and problem solving, are not only critical but constitute a key skills gap, alongside technical skills (Di Gregorio et al., 2019; McArthur et al., 2017; Rohm et al., 2021). Within digital marketing, the

**Table 1.** Key Academic Definitions of Analytics.

Term	Definition	Journal	Author (year)	Business application
(Business) analytics	“. . . we define analytics as a process that employs various techniques to analyze and interpret different forms of data to enable better decisions and improve firm performance.”	<i>Journal of Business Research</i>	Delen and Zolbanin (2018)	A method to support business decision making to improve firm performance.
Digital analytics	“For the purpose of this study, we refer to digital analytics as the technology-enabled analyses of data and processes using new-age technologies (such as AI, machine learning (ML), internet of things (IoT), blockchain, drones, etc.) and other online and offline data sources to design and deliver continuous, one-on-one personalized engagement in real-time.”	<i>Journal of Interactive Marketing</i>	Gupta et al. (2020)	A method to support marketing decision making to improve firm-customer engagement.
Marketing analytics	“Marketing analytics involves collection, management, and analysis—descriptive, diagnostic, predictive, and prescriptive—of data to obtain insights into marketing performance, maximize the effectiveness of instruments of marketing control, and optimize firms’ return on investment (ROI).”	<i>Journal of Marketing</i>	Wedel and Kannan (2016)	A method to support marketing decision making to improve firm financial performance.

specialty area which now constitutes most new marketing positions (Cowley et al., 2021), there is a need for technical skills, such as web analytics and search engine optimization (SEO), as well as skills in specific practical tools, such as Google Analytics (Rohm et al., 2021; Royle & Laing, 2014; Staton, 2016). The resulting work-ready digital marketer must have strategic digital marketing knowledge, technical skills, and strong communication skills (Royle & Laing, 2014). This industry requirement for well-rounded marketing graduates able to combine strategic knowledge with applied skills has also been observed in relation to analytics education (Houghton et al., 2018; Vriens et al., 2019).

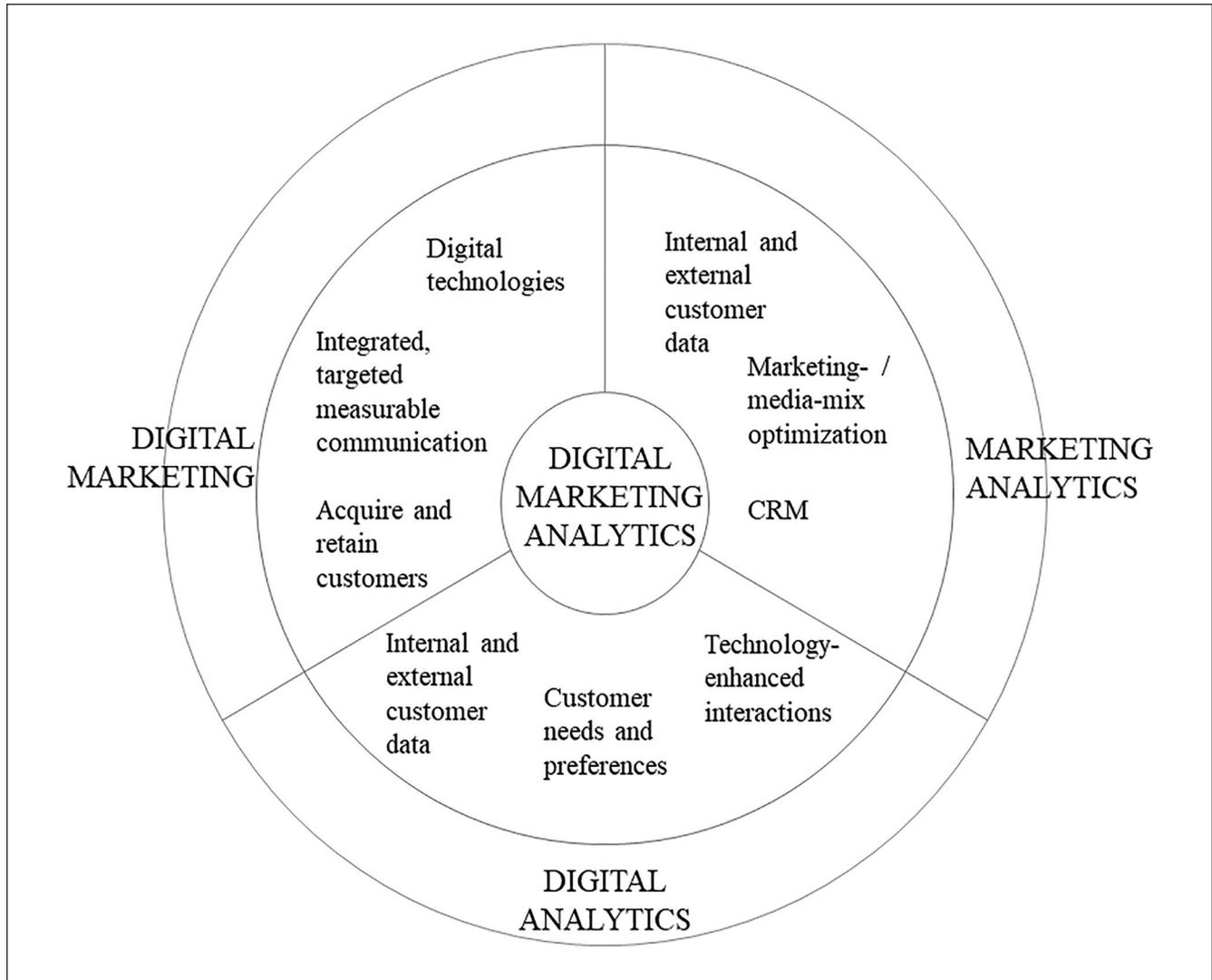
### Defining Analytics in Marketing

Analytics as a paradigm emerged from the rise of the internet and the exponential growth of data over the past two decades (Delen & Zolbanin, 2018). While big data analytics is a broad concept involving the analysis of a high volume, variety, and velocity of data to support decision making and action taking (Wang & Wang, 2020), marketing analytics has a long history but has achieved prominence in the past decade with its promise of data-driven decision making in the digital environment (Liu & Levin, 2018; Wedel & Kannan, 2016). There is no generally agreed definition of marketing analytics in the academic literature and there is an overlap with business analytics, with some researchers using the terms interchangeably (Haywood & Mishra, 2019; LeClair, 2018; Mintu-Wimsatt & Lozada, 2018). Digital analytics emerged from web analytics, an early technique to measure the performance of digital marketing (Chaffey & Patron, 2012; Järvinen, 2016; Järvinen & Karjaluoto, 2015). It has since expanded to include digital platforms traffic and conversion analysis, search engine marketing (SEM), social media analytics (Liu & Burns, 2018; Liu & Levin, 2018), machine learning, and other advanced technologies (Gupta

et al., 2020). Researchers generally agree that the underlying purpose of all analytics is to improve decision making by generating actionable insights (Delen & Zolbanin, 2018; Gupta et al., 2020), and that the biggest challenge for marketing is to derive value and measurable benefits from its use (Hanssens & Pauwels, 2016; Wedel & Kannan, 2016). Due to the variety of different analytics terms used in the literature, it is thus important to first provide an overview of existing definitions to create a shared understanding, before setting the focus and scope of this study. Table 1 lists the key definitions found in top marketing and business journals and identifies analytics’ business application when used in different contexts.

The key definitions, outlined in Table 1, illustrate the role of analytics as a method to improve an organization’s business outcomes in different areas. In this article, we use the term *digital marketing analytics* to denote a distinct discipline borrowing elements from digital analytics, specifically, its concern with technology-enhanced customer interactions (Gupta et al., 2020), and marketing analytics, specifically, its application in marketing-/media-mix optimization and customer relationship management (CRM); (Wedel & Kannan, 2016). We combine it with digital marketing, the use of digital technologies to create an integrated, targeted, and measurable communication to acquire and retain customers while building deeper relationships with them (Smith, 2007, as cited in Wymbs, 2011). Figure 1 visually represents the boundaries of digital marketing analytics and lists key concepts from its three components which together constitute the scope of this study.

The context of digital marketing is appropriate as firms increasingly prioritize it in a world dominated by technology companies (Walker & Moran, 2019) and much of contemporary marketing practice utilizes technologies, such as e-commerce, social media, websites, and online search (Rohm et al., 2019). Additionally, there is a growing preference



**Figure 1.** Digital marketing analytics.

among consumers for their social, communication and purchasing needs to be met primarily online, as part of a wider generational cultural shift toward a digital-first consumption environment (Gupta et al., 2020). Thus, the digital environment now represents marketing's key strategic site for the creation of value (Wedel & Kannan, 2016).

### *Analytics in Marketing Education*

Analytics does not currently have a natural home in the marketing curriculum and is still in a formative state (Liu & Burns, 2018). Analytics education reflects some of the lack of consensus observed in the academic literature. It has unclear boundaries, is interdisciplinary and wide-ranging, with different fields in marketing having different data and analytics requirements (Delen & Zolbanin, 2018; Krishen & Petrescu, 2018; Wedel & Kannan, 2016). Despite early calls

to add analytics to the marketing research course as a new way to create customer insights (Hauser, 2007), the classical marketing research course has changed little and is still predominantly taught (Nunan & Di Domenico, 2019). This may be because the collection and analysis of unstructured big data is fundamentally different to the structured data sets of classical marketing research (Kakatkar & Spann, 2019). In marketing practice, however, traditional methods have decreased, and the focus has shifted to collecting and analyzing large volumes of customer data from online interactions (Nunan & Di Domenico, 2019). The result has been a widening digital skills gap, with the demand for analysts significantly increasing in the marketplace and academia struggling to keep up (Houghton et al., 2018; Liu & Burns, 2018).

The integration of analytics into the curriculum is thus increasingly seen as essential for business schools to stay relevant (LeClair, 2018; Weathers & Aragón, 2019), and

universities have adapted in different ways to include the subject. Some have created new degree programs in Marketing Analytics or Business Analytics, with the provision of master's degrees largely outpacing that of undergraduate offerings (Weathers & Aragón, 2019; Wilson et al., 2018). While some have focused on the field's data science and computing aspects (Wilson et al., 2018; Wymbbs, 2016), there is a general consensus that a successful marketing analyst requires broad and deep skills across disciplines, alongside developed soft skills (Houghton et al., 2018; LeClair, 2018; Wedel & Kannan, 2016). This is less likely achievable in a single analytics course, particularly where this is mostly conceptual with little depth or application of practice, an approach common to undergraduate marketing curricula (Liu & Burns, 2018). Practical application should be incorporated in analytics education (Houghton et al., 2018; Liu & Burns, 2018; Wymbbs, 2016). Other approaches that have emerged include embedding analytics through program-wide curriculum mapping and design (Liu & Levin, 2018), and, creating a new deep dive course from the ground up that contextualizes analytics within one discipline such as social media marketing (Kim, 2019) or digital marketing more broadly (Liu & Burns, 2018). A final way of incorporating analytics has been to integrate some analytics tools and exercises with existing courses (Haywood & Mishra, 2019; Veeck & Hoger, 2014).

Previous research into knowledge and skills required for analytics has tended to foreground technical and quantitative skills (e.g., Liu & Burns, 2018), attempting to uncover whether “. . . better business decisions require more data or better models” (Wedel & Kannan, 2016, p. 104). However, this may not be able to address the key challenge that lies at the heart of all marketing analytics education—the need to link the data collected and analyzed with strategy, without which data has little business value (Mintu-Wimsatt & Lozada, 2018; Wedel & Kannan, 2016). The majority of new marketing roles are now in digital marketing (Cowley et al., 2021) and the digital marketing skills gap remains a critical challenge for marketing educators with no end in sight (Spiller & Tuten, 2019). There is an increasing need for educators to take a more holistic approach where theory and practice are integrated (Billore, 2021) to ensure students are “future proof and real-world ready” (Rohm et al., 2021, p. 205). By taking an integrative view, we can better understand how educators can help students develop analytics capability to be employable in marketing roles now and in the future.

## Methodology

The aim of this research is to identify the knowledge and skills marketing graduates require for analytics practice, in order to bridge the theory-practice gap between marketing education and industry needs and increase students' employability (Harrigan & Hulbert, 2011; Rohm et al., 2019; Vriens

et al., 2019). We draw on an exploratory research design to develop a holistic understanding of analytics capability for digital marketing practice. The first research stage was to create a practice-informed definition of digital marketing analytics based on marketing industry sources. The second stage consisted of a semisystematic analysis of academic and practitioner sources, which resulted in a purposeful sample of 21 studies to identify the knowledge and skills required for analytics capability in marketing practice. These academic articles and industry reports were then analyzed using directed content analysis (Assarroudi et al., 2018; Elo & Kyngäs, 2008; Hsieh & Shannon, 2005). Findings from the content analysis were further used to develop a practice-informed holistic analytics capability model for marketing educators. This model served as the basis to draw recommendations on how business schools could provide a more integrative analytics education aligned with the needs of the marketing industry.

## Practice-Informed Definition Development

To understand what digital marketing analytics capability in practice entails, we first needed to define it through the lens of practice. We sought to establish a working definition for digital marketing analytics based on practitioner views due to the observed lack of agreement on analytics in marketing in the academic literature (Delen & Zolbanin, 2018; Wedel & Kannan, 2016) and our aim to bridge the theory-practice gap in marketing education. We purposefully reviewed industry sources, which should be consulted for research in technological topics where practitioner affect is important (Adams et al., 2017).

An incognito Google Chrome search<sup>1</sup> was performed for the terms “digital analytics,” “digital analytics in marketing,” and “digital marketing analytics,” in combination with “definition.” The first two results pages of each search query were analyzed on December 19, 2019. The quality of each source was assessed by using the domain authority score, a metric developed by software company Moz that denotes the credibility of a website on a scale of 0 to 100.<sup>2</sup> Table 2 below presents definitions found in industry sources, such as websites and blogs.

While definitions of analytics also vary in the industry sources, some similarities among them can be identified. The top three knowledge concepts mentioned include understanding of customers, online experience, and online/marketing channels. These definitions also involve the required abilities to perform certain tasks, with the top three being data analysis, measurement and optimization, and performance and outcomes. The overall emphasis is on measuring customers' online experience and the effectiveness of organizational digital marketing efforts such as from websites or campaigns. While 5 out of the 10 sources are digital marketing software or service providers, and thus may have a

**Table 2.** Practitioner Definitions of (Digital) Marketing Analytics.

Term	Definition	Author (year)	Domain authority (0-100)	Knowledge concepts and skills
Digital analytics	“Digital analytics is the collection, measurement, analysis and reporting of data for optimizing channel usage.”	Chari (2012)	82	Data analysis Data collection Data reporting Marketing channels Measurement and optimization Customers Data analysis Data collection Data reporting Measurement and Optimization Online experience Online channels Performance and outcomes
Digital analytics	“Digital analytics encompasses the collection, measurement, analysis, visualization and interpretation of digital data illustrating user behavior on websites, mobile sites and mobile applications. . . . Using digital analytics data, companies can optimize the customer experience on their websites, mobile sites, and mobile apps, and also optimize their marketing ROI, content offerings, and overall business performance.”	AT Internet (2019)	75	Customers Data analysis Data collection Data reporting Measurement and Optimization Online experience Online channels Performance and outcomes
Digital analytics	“Digital analytics is the process of analyzing digital data from various sources like websites, mobile applications, among others. It provides a clear vision to the organization on how users or customers are behaving. . . . Digital analytics helps companies provide a better online experience to its clients as well as potential customers, which gradually results in the achievement of desired goals.”	HCL Technologies (2019)	63	Customers Data analysis Online channels Online experience Performance and outcomes
Digital analytics	“Digital analytics is the analysis of qualitative and quantitative data from your business and the competition to drive a continual improvement of the online experience that your customers and potential customers have which translates to your desired outcomes (both online and offline).”	Kaushik (2007) as cited by Stikky Media (2019)	36	Customers Data analysis Measurement and optimization Online experience Performance and outcomes

(continued)

Table 2. (continued)

Term	Definition	Author (year)	Domain authority (0-100)	Knowledge concepts and skills
Digital marketing analytics	“Digital marketing analytics is the translation of customer behavior into actionable business data. Today’s marketers can use digital analytics tools to examine the many online channels their buyers might interact with and identify new revenue opportunities from existing campaigns.”	Hudson (2019)	91	Customers Data analysis Measurement and optimization Online channels Performance and outcomes
Marketing analytics	“Marketing analytics [is] a math-based discipline that seeks to find patterns in data to increase actionable knowledge. . . . In the world of digital marketing, analytics is critical to understanding and predicting user behavior and optimizing the user experience (UX) to drive sales.”	Mailchimp (2019)	90	Customers Data analysis Measurement and optimization Online experience Performance and outcomes
Marketing analytics	“Marketing analytics is the measurement and optimization of your marketing activities. Rather than focusing only on your site’s performance like you do with web analytics, you focus on how your marketing efforts are performing, and adjust them accordingly.”	Lord (2012)	89	Marketing activities Measurement and optimization Performance and outcomes
Marketing analytics	“Marketing analytics, internet (or web) marketing analytics in particular, allow you to monitor campaigns and their respective outcomes, enabling you to spend each dollar as effectively as possible.”	WordStream (2019)	84	Online channels Performance and outcomes
Marketing analytics	“Marketing analytics is the practice of collecting and measuring marketing data to improve the performance of a website or app.”	Mixpanel (2019)	78	Data analysis Data collection Measurement and optimization Online channels Performance and outcomes
Marketing analytics	“Marketing analytics is the practice of managing and studying metrics data in order to determine the ROI of marketing efforts, as well as the act of identifying opportunities for improvement. . . . Marketing metrics are the data points themselves. Analytics is putting that data in the context of your brand and market, telling managers and investors a complete story about how your marketing efforts are driving revenue.”	Marketo (2019)	76	Data analysis Data reporting Measurement and optimization Performance and outcomes

**Table 3.** Inclusion/Exclusion Criteria for Semisystematic Literature Review.

Selection criterion	Included	Excluded
Study design	Qualitative and quantitative studies focusing on practitioner and industry data (e.g., data from job ads, surveys of/interviews with marketing professionals)	Qualitative and quantitative studies focusing on nonindustry data (e.g., curriculum analyses, theoretical or conceptual studies, interviews with students or faculty)
Type of publication	Peer-reviewed journal articles from <i>Journal of Marketing Education</i> , <i>Marketing Education Review</i> , and <i>Journal of Advancement for Marketing Education</i> Additional peer-reviewed journal articles screened for “marketing skills” keyword Industry literature from the first and second tier (Adams et al., 2017)	Academic and nonacademic textbooks Third tier industry literature (Adams et al., 2017)
Study outcomes	Studies that report skills, knowledge, or competencies	Studies that do not report skills, knowledge, or competencies
Publication date	2010-2020 (academic) 2015-2020 (industry)	Pre-2010 (academic) Pre-2015 (industry)

commercial interest in defining analytics in a way that helps them sell their tools and services, the academic literature confirms that in marketing practice, analytics is primarily used to measure and optimize digital marketing performance (Chaffey & Patron, 2012; Järvinen, 2016; Leeflang et al., 2014). After synthesizing the industry definitions, we propose a simplified digital marketing analytics definition informed by practice:

Digital marketing analytics is a method to *analyze and measure data* from digital marketing and *derive actionable insights to improve its performance*.

After identifying a practiced-based definition of digital marketing analytics, we use it to guide our investigation into the combination of knowledge and skills students require to be capable of analytics practice in marketing. The holistic view on digital marketing analytics capability means there is an integrated set of knowledge, soft and technical skills with the key aim to make results from data managerially actionable (Delen & Zolbanin, 2018; Gupta et al., 2020; Weathers & Aragón, 2019) and to derive value and measurable benefits from its use (Hanssens & Pauwels, 2016; Wedel & Kannan, 2016).

### Semisystematic Review and Study Sample

The second research stage consisted of a semisystematic review to identify and then synthesize the state of knowledge and skills relating to analytics capability across both academic and practitioner literature (Godin et al., 2015; Snyder, 2019). The search started with an analysis of Chartered Association of Business Schools ranked journal outputs dedicated to marketing education, focusing on the *Journal of*

*Marketing Education*, *Marketing Education Review*, and *Journal for Advancement of Marketing Education*. It was later extended to other journal articles which met the inclusion criteria with “marketing skills” as the primary keyword for screening and identifying academic studies.

The review then focused on recent large scale digital and business skills reports from trusted sources of first- and second-tier industry literature (Adams et al., 2017). Applying a semisystematic review to the gray literature is more complex as these sources are harder to locate and do not typically exist in one database; instead, they are dispersed across the internet and different search techniques should be used (Godin et al., 2015). Therefore, to identify these reports, Google and PDF search engines were used with search terms combining “digital marketing,” “digital skills,” “data skills,” “analytics skills,” “marketing skills,” “study,” “report,” and similar terms. Each report was then screened to ascertain its relevance and whether it matched the inclusion criteria.

The details of inclusion and exclusion criteria for selecting peer-reviewed journal articles and industry reports are presented in Table 3.

These academic and industry studies were selected purposefully as they offer detailed primary records based on marketing practitioner views. Academic studies which analyzed curricula in digital marketing or analytics were excluded, as were those studies exploring marketing analytics education from a research or teaching perspective but without practitioner input. Studies which focused on data science, business analytics, or data analytics in the context of computing were also excluded, as they did not provide insights on knowledge and skills required for entry-level marketing roles. The final study sample consisted of 21 studies, 12 of which were academic and 9 were industry reports. A summary of these studies is provided in the appendix (p. 45).

## Directed Content Analysis

Following the semisystematic review, a directed content analysis was completed to map key knowledge concepts and skills across the sample (Assarroudi et al., 2018; Elo & Kyngäs, 2008; Hsieh & Shannon, 2005; Snyder, 2019). The coding categories were developed by the primary investigator from the definitions of digital marketing and digital marketing analytics and mapped to four top-level categories of knowledge and skills, which were used as priori codes (Creswell, 2013; Miles et al., 2014) in line with directed content analysis (Elo & Kyngäs, 2008; Hsieh & Shannon, 2005). This approach was chosen for its flexibility as it allowed for new subcategories to be added through the coding process as new concepts that may have implications for the research question could be integrated (Hsieh & Shannon, 2005). After an initial review, the draft coding book was revised and updated to reflect the expanded categories of knowledge, technical skills, tool skills, and soft skills. These four categories are subsequently explained.

The *Knowledge* category consists of conceptual knowledge, which can be understood as content referring to theoretical or foundational material required by marketing graduates (Schlee & Harich, 2010; Ye et al., 2017). *Technical skills* are defined as practical application and hands-on abilities (Liu & Burns, 2018). It is important to make a distinction between technical skills and the ability to use specific digital tools as these are typically presented together (LeClair, 2018; Schlee & Karns, 2017). While technical skills are much broader in nature and have longevity, the tools themselves have a much shorter lifespan due to the rapid pace of technological change (Crittenden & Crittenden, 2015; Crittenden & Peterson, 2019; Rohm et al., 2021). *Tool skills* thus refers to the ability to work with specific software packages, digital tools, and platforms (Liu & Burns, 2018). *Soft skills* refer to transferable skills which primarily focus on personal attributes and characteristics (LeClair, 2018; Liu & Levin, 2018), referred to as meta skills in some studies (Rohm et al., 2019). The final codebook with the resulting four categories and 20 corresponding subcategories is portrayed in Table 4.

Knowledge concepts and skills were coded for existence, that is, when they were present in the text. The primary coding principle was either an exact match or a close synonym of a specific code similarly to the study by Schlee and Karns (2017). Where two or more similar terms existed, we chose the words that were more commonly used in the industry as opposed to terms from the academic sources. For example, “critical thinking” was coded as “problem solving.” For “interpersonal skills,” we accepted synonyms such as “teamwork,” “relationship building,” and “collaboration.” Some concepts were used differently depending on context. For example, “analytical skills” could refer both to data analysis (a technical skill) or problem solving (a soft skill). Depending

on the contextual meaning, the ambiguous terms were coded to the most appropriate category.

## Results

The sample of 21 studies was independently coded in NVivo 12 by both researchers, and the intercoder reliability between them was 90%. All discrepancies were discussed until consent was reached. The results of the directed content analysis are presented in Table 4, which lists the four top-level categories (parent nodes) in the first column, followed by the entire list of 20 codes (child nodes) and the frequency (*n*) with which they appeared in the sample. The final column displays example terms coded under each subcategory. The findings thus show the most frequently mentioned knowledge concepts and skills in the literature and the relative importance of the different categories from the perspective of marketing practitioners.

The results indicate that marketing graduates with analytics capability require conceptual knowledge of three key areas, which are marketing communications, measurement and evaluation, and digital technologies. Findings also demonstrate the fundamental importance of certain critical technical and soft skills, aligning with research that suggests these are a high priority for graduate employers (Finch et al., 2013; Schlee & Harich, 2010; Schlee & Karns, 2017). The top technical skills include data analysis, SEO & SEM, and CRM & database skills, and top soft skills include communication and presentation, interpersonal skills, and problem solving. Specific tool skills were relatively less important and less frequently mentioned in the studies. The implications of these findings are discussed in the next section together with the introduction of a practice-informed digital marketing analytics capability model.

## Practice-Informed Model and Discussion

The practice-informed digital marketing analytics model is a visual representation of the key findings. This model encapsulates the most important knowledge and skills emerging from the research and represents those qualities which are required for analytics capability in marketing practice. Figure 2 demonstrates that digital marketing analytics capability is holistic emerging at the center of the four parent nodes and requiring conceptual knowledge that provides the theoretical background and strategic context for analytics, technical skills to be able to apply knowledge in practice, tool skills to be trained in specific software, and soft skills to facilitate the communication of insights. The font size of the attributes in each category reflects their relative importance and frequency of occurrence in the reviewed literature.

Four major insights emerge from the findings that should be considered by marketing educators and researchers. Each

**Table 4.** Coding Variables and Frequency (*n*) of Attributes Required for Digital Marketing Analytics Capability.

Parent nodes	Child nodes	<i>n</i>	Example terms used in studies
Knowledge	Marketing communications	17	Marketing campaigns, social media marketing, advertising
	Measurement and evaluation	14	Metrics, evaluating data, KPIs, optimizing performance
	Digital technologies	14	e-commerce, internet marketing tools, marketing automation, social media platforms
	Customer acquisition, retention and customer relationships	13	Customer conversion, customer engagement, customer relationship management, customer experience, CRM (concept)
	Digital marketing	8	Internet marketing, online marketing
Skills (technical)		61	
	Data analysis	15	Data analytics, quantitative analysis, predictive analytics, text analytics
	SEO and SEM	12	Search engine optimization, search engine marketing, pay-per click (PPC)
	CRM and database skills	12	CRM (software), database management, database analysis
	Web analytics	9	Internet marketing analytics (website context), digital analytics (website context), dashboards (website context)
	Data mining	6	n/a
	Statistics	4	Descriptive statistics, statistical knowledge
	Social media analytics	1	n/a
Skills (tools)		22	
	Excel	8	Spreadsheets, pivot tables
	Google Analytics	6	n/a
	Business intelligence tools	5	Tableau, SAS, BI software
	Statistical tools	4	SPSS, R, statistical software
	Google Ads	3	Google AdWords
Skills (soft)		56	
	Communication and presentation	18	Oral, written, and verbal communication skills, data visualization
	Interpersonal skills	17	Teamwork, relationship skills, collaboration
	Problem solving	12	Analytical skills, critical thinking, creativity
	Self-management	9	Prioritization, time management, initiative, productivity, independent learner

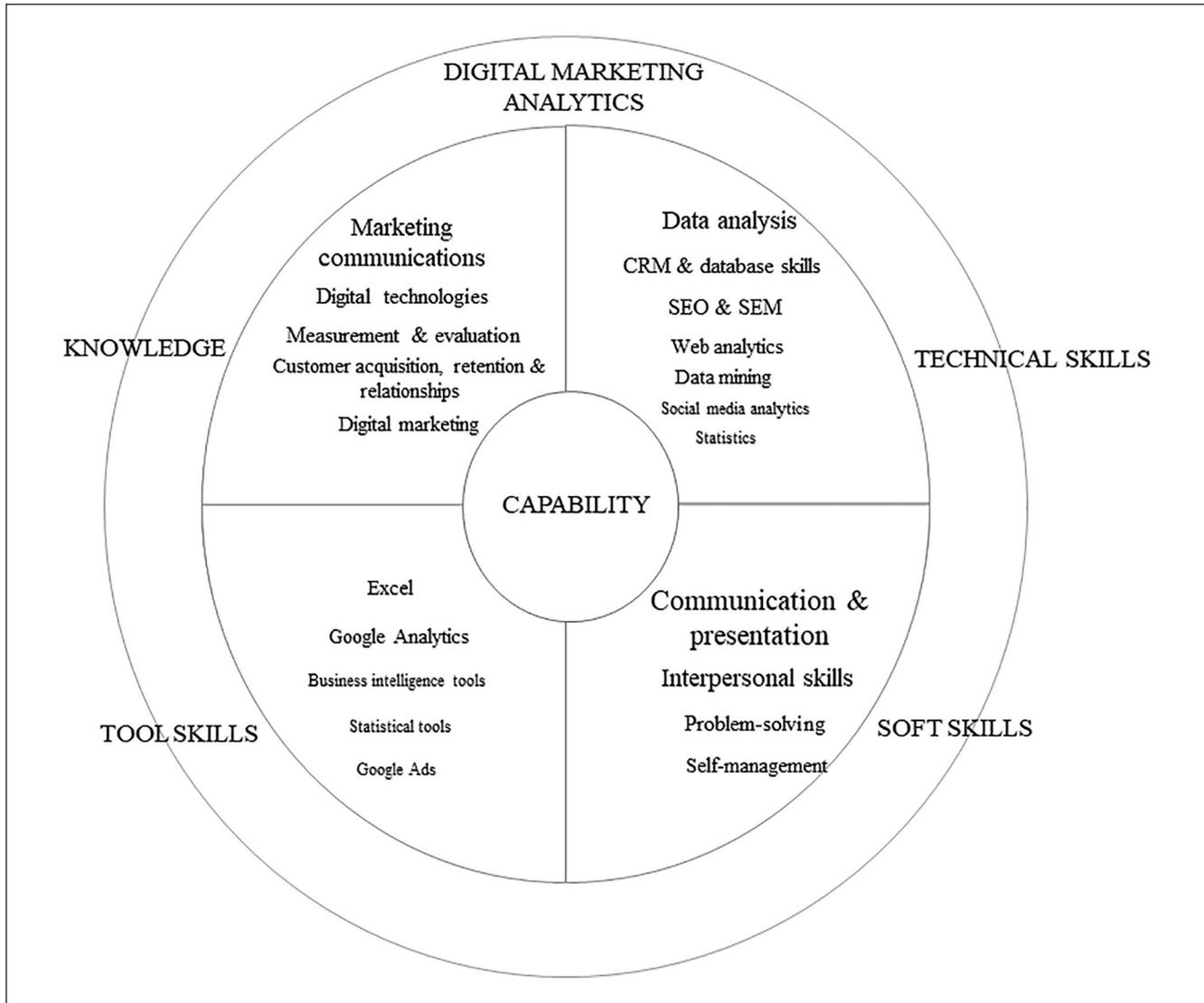
is described in the following paragraphs, together with the implications and corresponding recommendations for marketing educators.

### *Data-Driven Marketing Communications Knowledge Is Essential*

The first insight emerging from the analysis is that certain knowledge concepts are critical for entry-level marketing graduates skilled in analytics. The most often mentioned topics relate to technology-enabled measurable marketing communications. The findings support previous research into practice-informed marketing education, which emphasized communications and channel knowledge (Finch et al., 2013; Harrigan & Hulbert, 2011). Topics relating to digital technology appeared in 14 studies, and included e-commerce, mobile and apps, digital platforms, and marketing automation, confirming the high demand for professionally relevant, conceptual knowledge in relation to various technology observed elsewhere (Harrigan & Hulbert, 2011; Langan et al., 2019; Schlee & Karns, 2017). Another consistent finding in 14 studies is the importance of measurement,

including the knowledge of metrics and how to evaluate data from marketing campaigns, consumers, and competitors (Gilbert, 2017; Liu & Burns, 2018). Digital marketing as a distinct discipline was mentioned in eight of the 21 studies, and was in some studies the most sought-after occupational knowledge required by employers (McArthur et al., 2017; Royle & Laing, 2014).

The findings demonstrate that conceptual knowledge in certain areas remains central to ensure graduates with high employability. If business schools aim to remain relevant in addressing industry needs, they should align with a digital orientation and prioritize digital-first curriculum designs (Langan et al., 2019; Rohm et al., 2019). We highlight that digital marketing (as a separate knowledge concept) should be taught separately from traditional marketing courses. New emerging technologies, such as machine learning, artificial intelligence, internet of things, and more traditional marketing technologies, such as e-commerce, marketing automation or different social media platforms, should be also included in marketing education to ensure that students have the foundational knowledge in these areas. However, a strategic understanding of this marketing knowledge and digital



**Figure 2.** Digital marketing analytics capability model.

technology is required (Houghton et al., 2018; Royle & Laing, 2014).

### *Certain Technical Skills and Tools Are Critical*

The findings reveal that the ability to analyze data is the most commonly mentioned technical skill, and constitutes a major skills gap within contemporary marketing practice (General Assembly, 2020; Institute of Data & Marketing, 2019). Research shows there is an increasing demand for job candidates with data analysis skills, and these jobs are also associated with higher wages (Kim, 2019; Schlee & Karns, 2017; Wedel & Kannan, 2016). However, the technical skills and tools traditionally taught in market research courses, such as statistics and SPSS, were only mentioned in four out of the 21 studies analyzed. This suggests that traditional research

methods are less relevant in modern marketing practice where the emphasis is on deriving insights from existing data, often in real time, to improve firm performance (Finch et al., 2013; Liu & Burns, 2018; Nunan & Di Domenico, 2019).

CRM and database skills, which allow firms to collect, analyze and use data from their customers, were found in more than half of the studies, confirming the expansion of customer insights as a critical domain of marketing practice (Buttle & Maklan, 2019; Harrigan & Hulbert, 2011) where CRM is core to effective analytics (Spiller & Tuten, 2019; Weathers & Aragón, 2019; Wilson et al., 2018). Technical skills relating to digital marketing were frequently required, including SEO, SEM and web analytics to analyze the effectiveness of a campaign (Liu & Levin, 2018; Staton, 2016). The findings show that that only a few specific analytics

tools are needed in marketing practice. Surprisingly, Excel was the most important, followed by Google Analytics, an application for web and digital marketing analytics.

Thus, a priority for educators should be to improve technical skills among marketing students in order to close the theory-practice gap and meet one of the most urgent industry needs (Institute of Data & Marketing, 2019; Royle & Laing, 2014; Schlee & Karns, 2017). We recommend that a marketing graduate have basic skills in common analytics applications and techniques used in industry. Tools used by practitioners (e.g., Google Analytics or HubSpot CRM) could be taught by integrating third-party certifications as part of the curriculum (Cowley et al., 2021; Spiller & Tuten, 2019; Staton, 2016). Thus, third-party certifications could be used successfully in developing students' technical skills, completing the strategic marketing knowledge with hands-on experience with various marketing technologies and tools (Cowley et al., 2021). Researchers also agree that these certificates are an effective and efficient way of exposing students to marketing analytics practice (Cowley et al., 2021; Mintu-Wimsatt & Lozada, 2018; Spiller & Tuten, 2019; Staton, 2016). Various third-party industry certifications are available for educators, including Google Analytics, Google Ads Academy, HubSpot Academy, or Hootsuite Academy (for full details on certification types please refer to Cowley et al., 2021). Some of these certifications also include additional instructor resources and functionality to track students' progress.

### *Soft Skills Are Fundamental*

In the studies analyzed, soft skills emerged as a crucial skill required for entry-level marketers and practitioners at all levels, supporting extant research which emphasizes the critical importance of soft skill development for marketing students (Finch et al., 2013; McArthur et al., 2017; Schlee & Harich, 2010; Schlee & Karns, 2017). Soft skills, particularly communication and presentation, were frequently mentioned in industry sources. For example, data visualization and the creation of dashboards are critical to allow data to become actionable (Harrigan & Hulbert, 2011), and effective communication of data insights to stakeholders is fundamental to data-driven decision-making (Digital Analytics Association, 2014; LeClair, 2018; Rohm et al., 2019). In addition, interpersonal skills are important so that teams collecting and analyzing data and those using this data can collaborate (General Assembly, 2018; Houghton et al., 2018).

Soft skills are the most sought after in entry-level marketing roles (Data & Marketing Association, 2019; Schlee & Karns, 2017) and are perceived by industry to constitute a significant skills gap in marketing practice (Di Gregorio et al., 2019; Finch et al., 2013). Some studies even suggest that soft skills are the most important in the new economy overall as quantitative skills are more at risk of being

automated (Burning Glass Technologies, 2018, 2019; LeClair, 2018). Business schools' approach to teaching data communication in the form of a written market research report is not appropriate for communicating data to 21st-century decision makers, who are overloaded with information and lacking in time (Nunan & Di Domenico, 2019). We recommend that educators instead teach techniques that practitioners use to communicate insights from data, such as dashboards and other forms of data visualization (Nunan & Di Domenico, 2019; Weathers & Aragón, 2019). These methods could be included as part of a technical tools training workshop in lab-based sessions.

Additionally, data communication skills could be integrated and assessed more explicitly as learning outcomes as a part of live digital marketing projects (Houghton et al., 2018; Rohm et al., 2019). Live project-based learning could be used by educators to successfully develop students' soft skills and technical skills (Rohm et al., 2021). The value of experiential and live project-based learning in bridging the theory-practice gap (Spiller & Tuten, 2019; Wilson et al., 2018; Ye et al., 2017), as well as developing these soft skills through real-world projects or work placements (Rhew et al., 2019; Rohm et al., 2019) has been demonstrated.

### *Digital Marketing Analytics Capability Requires a Holistic Approach*

The practice-informed model of digital marketing analytics capability demonstrates a holistic view of how knowledge and skills can be developed in students. Students with well-rounded analytics capability require knowledge of strategic marketing, and training in technical analytical skills and in soft, in particular, communication skills (Houghton et al., 2018; Royle & Laing, 2014). A key implication is that analytics education in marketing should be practice-informed to ensure these skills can be applied to real marketing contexts (Nunan & Di Domenico, 2019). The findings also reveal soft skills, particularly communication skills, play a crucial role in developing analytics capability. The subject should be taught in a holistic manner as interpreting and communicating data is fundamental for marketing decision making, and our findings confirm these skills are critical in successful analytics practice (Nunan & Di Domenico, 2019; Weathers & Aragón, 2019; Wilson et al., 2018). Educators should not only focus on technical skills such as analyzing and measuring data, but, also, on analytics' contribution to strategy and how to communicate these insights to a variety of decision makers. As marketing departments increasingly need to justify their spending, marketers that can use analytics to demonstrate returns from their digital marketing activity (Leeflang et al., 2014; Liu & Burns, 2018) become even more relevant.

Given the differences in level and structure between academic programs and institutions, we do not suggest a detailed

**Table 5.** Recommendations for Educators for Holistic Analytics Capability Teaching.

Topic	Knowledge	Technical	Tool	Soft	Learning activity
Data-driven marketing	Digital technologies Measurement and evaluation	Data analysis (Google Ads)	Excel	Communication Problem solving	Lab-based data visualization training
Digital campaigns	Marketing communications Measurement and evaluation Digital technologies	PPC	Google Ads	Communication Interpersonal	Google Impact Challenge project
Social media marketing	Marketing communications Measurement and evaluation Digital technologies	Social media analytics	Instagram	Communication Interpersonal	Live client social media project

design for a new analytics course or program, which has been attempted elsewhere (e.g., Houghton et al., 2018; Kim, 2019; Liu & Burns, 2018). Instead, we offer actionable take-aways for marketing educators on how key knowledge and skills could be embedded in marketing education. We recommend that educators take a holistic approach to teaching digital marketing analytics, where at least one knowledge concept and/or skill from each of the four parent nodes of the model is used to design a digital marketing analytics learning activity. For example, marketing communications and measurement & evaluation (knowledge) could be combined with web analytics (technical) and Google Analytics (tool) in a live client project, where students practice communication, presentation, and interpersonal skills (soft) to share their findings with an external client. Three additional suggestions on how to incorporate holistic analytics teaching are provided in Table 5.

By integrating analytics in the context of marketing practice, educators can close the theory-practice gap and meet the need for analytically capable graduates aligned with market demand (Cowley et al., 2021; Spiller & Tuten, 2019), while equipping students with the practical experience increasingly essential to secure an entry-level role (McArthur et al., 2017; Schlee & Karns, 2017).

## Implications for Marketing Education

The practice-informed approach to teaching digital marketing analytics reveals tensions between theory and practice that go beyond the discipline of marketing and raises bigger questions about the role and purpose of higher education, although this is a long-standing debate and unlikely to be resolved easily (Nunan & Di Domenico, 2019; Spiller & Tuten, 2019). Our recommendations relating to practice-informed capability education may be challenging for educators, since it advocates for a curriculum design that gives students conceptual knowledge of data-driven marketing with practical experience in the real world. This implies that faculty should be skilled across all four areas of the digital marketing analytics capability model and capable of teaching and assessing both knowledge and skills, while keeping up to date in the rapidly changing field of digital marketing

that continues to be transformed by technology (Rohm et al., 2019; Spiller & Tuten, 2019).

The pressures arising for marketing educators from the demand to remain current and informed by the needs of industry have been noted (Mintu-Wimsatt & Lozada, 2018; Muñoz & Wood, 2015; Spiller & Tuten, 2019). There are systemic barriers, given that success in academia is largely defined in terms of research (knowing), and career progression is tied to innovative research which often involves developing expertise in a narrow and theoretical field. Thus, there is little incentive for educators to prioritize teaching innovation or focus more on skills development as this may harm their chances of professional advancement and promotion (Mintu-Wimsatt & Lozada, 2018). Since the interdisciplinary nature of analytics lends itself to cross-departmental teaching, some of its more technical aspects could be taught by computing faculty, which is already taking place (Nunan & Di Domenico, 2019; Wymbs, 2016).

Another set of barriers related to practice-informed, holistic teaching pertains to resource constraints. The greatest challenge for marketing educators is the time and effort required to stay current (Muñoz & Wood, 2015). Within the subject of analytics, there is a considerable lack of knowledge and skills among existing marketing faculty as most undertook their academic training before the advent of big data and thus lack both the expertise and interest in integrating the subject with their teaching (Liu & Burns, 2018; Mintu-Wimsatt & Lozada, 2018). Other constraints include the lack of quality resources for teaching analytics as well as practical considerations such as the need for computer labs and/or specific software to teach technical skills, which may not be easily available to many business schools for financial or other reasons (Liu & Burns, 2018; Muñoz & Wood, 2015; Spiller & Tuten, 2019). As it is unlikely that existing faculty will easily and readily be able to teach analytics due to inherent tensions in the current academic system, it may be appropriate to hire educators or practitioners who can specifically develop and integrate analytics into the marketing curriculum (Liu & Burns, 2018). Alternatively, educators could integrate trusted industry certificates in a targeted, cost-effective way to upskill both themselves and their students (Cowley et al., 2021; Spiller & Tuten, 2019).

## **Conclusions, Limitations, and Directions for Future Research**

### *Conclusions*

This study argues for a practice-informed approach to marketing education, in order to bridge the theory-practice gap and increase students' employability. We have used a practitioner lens to develop a digital marketing analytics capability model for educators and have offered insights on how to integrate it in existing marketing curricula. This article contributes to emerging research on how business schools can better develop work-ready graduates and meet the needs of 21st-century industry and students (Billore, 2021; Rohm et al., 2021). It also makes a theoretical contribution by providing definitional clarity to key analytics terms to help marketing researchers share a clearer understanding and increase coherence in the body of research.

### *Limitations and Future Research*

We also acknowledge the limitations of our study. One of these is that the sample for the semisystematic review comprised both industry and academic sources, with a variety of different data collection methods used. Some of the industry literature has a commercial interest in conducting and publishing research into the lack of digital skills as they

are providers of digital marketing courses, services and/or software. Nevertheless, these studies offered insights into larger data sets than are available in the academic literature.

The current study adopted an exploratory approach, identifying a set of required knowledge and skills to develop capability for analytics in marketing practice. However, it requires validation to become effective, and future research might include a focus group of marketing practitioners to probe the rigor of these findings across the marketing industry. Future research could also test the digital marketing analytics capabilities model with early career practitioners.

A broader issue requiring further research is the exact role of soft skills education in academia, including whether or how these should be part of the formal marketing curriculum. Soft skills tend to be the most requested by employers (Di Gregorio et al., 2019; McArthur et al., 2017) and are the most lacking in graduates, while typically not being part of academia's remit (Finch et al., 2013; Rhew et al., 2019). In the digital economy purely quantitative tasks are more likely to be automated in the future, thus increasing the value of well-developed soft skills such as interpersonal and communication skills (Burning Glass Technologies, 2019; LeClair, 2018). Thus, future research could conduct a review of marketing curricula to investigate to what extent soft skills are currently part of a formal curriculum, for example in explicit learning outcomes or as a standalone course.

## Appendix

### Summary of Included Studies.

Publication type	Author (year)	Population and setting	Aim	Methods	Outcomes
Academic	Schlee and Harich (2010)	500 Marketing job advertisements (The United States)	This study examines the skills and conceptual knowledge that employers require for marketing positions at different levels	Content analysis	New and recent marketing graduates require skills more than marketing knowledge for their jobs. Technical and data analysis skills are highly important, as are meta skills, for entry-level positions.
Academic	Wellman (2010)	250 marketing job advertisements (The United Kingdom)	The purpose of this study is to inform the development of vocationally focused marketing curricula by identifying the employability attributes required from new and early career marketing graduates.	Content analysis	52 Attributes, within 16 clusters, were identified; commonly required meta skills include communications and relationship skills, ICT skills including data analysis also highly important.
Academic	Harrigan and Hulbert (2011)	In-depth interviews: 70 senior marketing practitioners (The United Kingdom)	The aim is to find out what marketing concepts and skills should be taught in order to meet practitioners' needs.	In-depth interviews (n = 70)	A "new Marketing DNA" should be taught in higher education to better prepare graduates for practice. Technical skills including marketing analytics are highly important.
Academic	Finch et al. (2013)	Survey: 253 marketing practitioners (Canada)	The aim is to discover marketing practitioners' top priorities for improvement in marketing education.	Survey (n = 253)	Four conceptual knowledge categories and one meta skill category should be covered in marketing education according to practitioners. Meta skills including communication and problem solving are a high priority for improvement.
Academic	Royle and Laing (2014)	In-depth interviews: 20 communication industry professionals (Aberdeen, Scotland) Focus group: 6 Public Relations Industry Advisory Group (PRIAG) members and 7 university marketing staff (Aberdeen, Scotland)	The research aims to specify any digital marketing skills gaps encountered by professionals working in communication industries.	In-depth interviews (n = 20) Focus group (n = 13)	A digital marketer requires strategic digital marketing knowledge, technical skills, and strong communication skills.
Industry	Digital Analytics Association (2014)	Competency development task force: 9 digital analytics professionals (The United States)/The United Kingdom) Job task analysis panel: 14 digital analytics professionals (The United States) International review group: 4 digital analytics professionals (Hong Kong, India, Switzerland, The United Kingdom) Survey: several hundred practitioners (global)	The aim is to develop a competency framework and define the knowledge and skills needed to perform successfully in the digital analytics profession, at three experience levels (entry, mid, and advanced level) and two tracks: technical and analytical.	Modified Delphi study (n = 14) 6x validation surveys (several hundred practitioners)	An entry-level digital analyst (analytical track) requires strong strategic knowledge (especially in business objectives and measurement) alongside meta skills including communication and analytical skills (problem solving). Technical skills including data analysis and the use of spreadsheets and analytical tools are highly important.
Academic	Staton (2016)	173 Entry-level digital marketing job advertisements (The United States)	The aim is to uncover what topics should be taught in the area of digital marketing to increase the success rate of students in the job market	Content analysis	The top 4 skills required for entry-level digital marketing roles are Web analytics, email marketing, inbound marketing, and social media management.
Academic	Schlee and Karns (2017)	210 Entry-level marketing job advertisements (The United States)	This study examines the knowledge, skills, and personal attributes in listings for entry-level marketing jobs in the United States and the accompanying salaries.	Content analysis	Technical marketing knowledge (e.g., internet marketing and metrics) and technical skills such as data analytics are associated with higher wages. The most requested meta skills are communication and teamwork.
Academic	Gilbert (2017)	250 Entry-level advertising job advertisements (The United States)	This article analyzes the information literacy skills that employers require for entry and lower level advertising professionals.	Content analysis	The most frequently mentioned skills are using information in practice (communication skills) and collaboration (relationship skills).
Industry	Burning Glass Technologies (2017)	130 Million job advertisements (The United States)	The aim is to identify the key skills, tools and competencies that make up the data science and analytics (DSA) jobs ecosystem and are most required in the labor market	Text mining techniques	The individual skills and competencies required for DSA jobs varies across the analytics landscape. Within marketing, there is a need for domain knowledge (e.g., market strategy), meta skills and specific technical skills.
Academic	McArthur et al. (2017)	359 Marketing job advertisements (Australia)	This study aims to identify, through the content analysis of job advertisements, the specific skills and attributes demanded by employers from candidates seeking graduate marketing jobs in Australia.	Content analysis	Meta skills such as communication skills and time-management are the most highly sought after. The most requested domain knowledge is in digital marketing. The call for practical experience across a range of marketing areas was significant.

(continued)

## Appendix. (continued)

Publication type	Author (year)	Population and setting	Aim	Methods	Outcomes
Industry	General Assembly (2018)	10,000 Professionals taking a digital marketing skills assessment test, either to guide internal training or as part of a recruitment process (mainly The United States)	The aim is to find out about the state of digital marketing skills and learn about the people within the industry.	Data mining techniques	The top missing skill in contemporary marketing is data analysis. There is also a skills gap regarding technical knowledge of digital channels (unfamiliarity with technical topics across channels). Communication skills are important so that teams providing data (e.g., technology) and teams using data (e.g., marketing) can understand each other.
Academic	Liu and Burns (2018)	1.04 Million tweets that mentioned "marketing analytics", 13 marketing analytics course syllabi (The United States) 400 Job advertisements containing "marketing" and "analytics", (The United States) Survey: 33 business executives (LinkedIn)	This study aims to assist the design and implementation of a marketing analytics course	Text mining techniques Survey (n = 33)	An outline of the technical skills and knowledge concepts to be covered in an analytics course for marketing students. Top skills include data analysis, social media analytics and search engine optimization skills.
Industry	Institute of Direct & Digital Marketing (2018)	Survey: 377 marketing and business professionals (The United Kingdom)	The aim is to investigate the skills marketers use day-to-day, as well as those needed to progress in their career.	Survey (n = 377)	Marketing roles are becoming more data-driven. Data analysis and reporting are critical technical skills.
Industry	Burning Glass Technologies (2018)	56 Million resumes (The United States) 150 Million job descriptions (The United States)	The aim is to find out which skills are in demand in digitally intensive jobs and more broadly.	Text mining techniques, longitudinal (2007 onward)	An outline of 14 skills that are in high demand (high growth) since 2012, and critical in the new economy. Meta skills (human skills) are the most important, data analysis skills have seen significant growth.
Academic	Di Gregorio et al. (2019)	776 job advertisements containing "marketing" (Italy) Survey: 1,562 marketing practitioners (Italy) Survey: 125 marketing practitioners (France) Survey: 125 marketing practitioners (Spain) Survey: 125 marketing practitioners (Germany) Survey: 125 marketing practitioners (The United Kingdom)	The aim of the study is to propose a new framework relating to the knowledge, capabilities and skills that marketing graduates require to succeed in the digital domain.	Content analysis 5x surveys (n = 2,062)	The study identifies five employability skill categories and 29 skills and capabilities. Soft skills (e.g., communication and interpersonal skills) are the most important across all countries and firm types. Highly digitalized firms prioritize digital and technical skills, while lowly digitalized firms appreciate analytical skills the most.
Industry	Data & Marketing Association (2019)	Survey: 141 business managers (The United Kingdom)	The aim is to presents employer views on the skills they deem important for entry-level marketing employees to have and which they think will be important in the future.	Survey (n = 141)	Meta skills (soft skills) are more important for entry-level marketing employees to have. Data analysis skills are increasingly important in junior roles.
Industry	Institute of Data & Marketing (2019)	Survey: 148 mid-level marketers (The United Kingdom)	The aim is to find out what marketing skills are important to business success.	Survey (n = 148)	Data skills were deemed the most important for business; however, they are most lacking in organizations
Industry	Burning Glass Technologies (2019)	9.4 Million online job advertisements (The United Kingdom)	The report aims to provide an overview of digital skills demand and to help inform the development of evidence-based digital skills policy.	Text mining techniques	Digital skills are a near-universal requirement for jobs in the United Kingdom. Technical skills and human (meta) skills may help avoid the risk of automation.
Academic	Rhew et al. (2019)	200 Entry-level management job advertisements (The United States)	This article seeks to identify the gaps between employer needs, curricular priorities, and accrediting standards, specifically in the management domain.	Content analysis	Employers require management graduates with developed soft skills, such as self- management, leadership, teamwork, and communication, more than hard knowledge and technical skills.
Industry	General Assembly (2020)	20,000 Professionals (across 77 countries) taking a certified marketing skills assessment test, either to guide internal training or as part of a recruitment process	The aim is to move beyond a focus on specific digital marketing skills to instead uncover the broad set of skills needed to be a marketer in the digital age.	Data mining techniques	The skills gap in contemporary marketing is primarily driven by analytics and marketing technology.

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## Notes

1. Incognito mode or “private browsing” is a privacy feature on Google Chrome that disables your browsing history, and your search results are therefore un-personalized.
2. Websites with a very large number of high-quality external links pointing to them tend to be at the top end of the domain authority scale, as this implies many other authoritative websites endorse them.

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