

Project Work in Focus: Examining Different Pathways for Acquiring Project Management Skills

**Honing Your
Business Skills**



**PROJECT WORK:
COMPLICATION**

Author



Dr. Thomas K. Hamann

T. K. Hamann Gesellschaft mbH
Executive Director

Examining Different Pathways for Acquiring Project Management Skills

The growing significance of project work has underscored the need for effective project management, yet most projects continue to face challenges in achieving their objectives on time and within budget. Studies indicate that only a small percentage of projects successfully meet all goals within the expected timeframe and budget, with failure rates remaining consistently high across various industries. A significant contributing factor to this trend is the pervasive lack of project management skills, frequently resulting from inadequate or insufficient training.

This paper explores three primary pathways for acquiring project management competencies:

- (1) Academic degree programs,
- (2) Professional certifications, and
- (3) Training within top-tier consulting firms.

Academic degree programs provide structured theoretical knowledge but often lack the hands-on experience necessary for real-world project management. Professional certifications, such as the widely recognized PMP® credential from the Project Management Institute (PMI), emphasize theoretical frameworks and standardized exams but fail to develop practical problem-solving abilities. In contrast, training within leading consulting firms, such as McKinsey & Company, the Boston Consulting Group (BCG), and Bain & Company, offers the most comprehensive development approach, integrating theoretical learning with real-world application, structured problem-solving, and continuous feedback mechanisms.

The study concludes that successful project management education must balance theory with practical application. Although many employers and clients of consulting work prefer to hire professionals with certifications, these certifications are far from sufficient to prepare professionals for the complexities of project delivery. To equip project managers with the necessary skills for success, organizations should prioritize experience-based learning, mentorship, and continuous development. A fundamental shift in the widely available project management education is needed, moving beyond knowledge acquisition to skill application and critical thinking.

Most Projects Fail

Due to the increasing importance of project work, its success is becoming more and more important. It is therefore fatal that most projects fail. Only 31 percent of software projects are successful, while 50 percent are not completed on time, over budget, or do not satisfy customers or users, and 19 percent fail completely—percentages that have remained nearly constant in recent years (The Standish Group 2015; Johnson 2020 as cited in Portmann 2021). Nieto-Rodriguez (2022, p. 23) assumes that these orders of magnitude apply not only to software projects but to all projects undertaken worldwide. In fact, a joint survey by KPMG, the Australian Institute of Project Management (AIPM), and the International Management Association (IPMA) (2019) of nearly 500 participants with project and program leadership roles from 57 countries found that only 19 percent of organizations complete their projects successfully—at least most of the time. The survey also found that ...

... only 46 percent of projects satisfy stakeholders,

... only 44 percent of organizations deliver achieve the original goals and business purposes of their projects,

... no more than 36 percent of organizations are very likely to meet their project budgets, and

... only 30 percent of organizations are likely to complete their projects on time.

Some estimates put the failure rate of artificial intelligence (AI) projects as high as 80 percent (Bojinov 2023). And according to Burke (2024), 88 percent of business transformations fail to achieve their original ambitions.

Only 2.5 percent of organizations successfully complete all their projects (PwC 2014). In another survey, 40 percent of respondents said that only half or less of the projects in their respective organizations deliver the planned benefits (see Exhibit 1).

Top Reasons for Project Failure

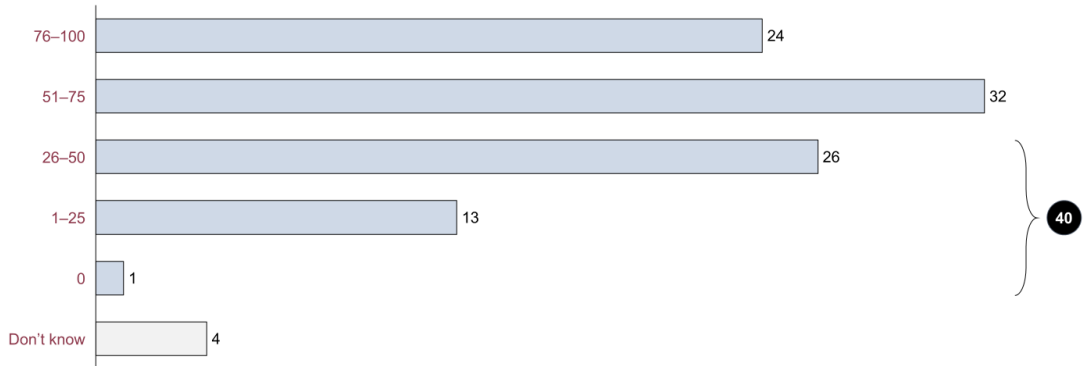
Winters (2003) and several others (e.g., Antony & Gupta 2018; MacNeil 2024; Simplilearn 2024) list the top reasons for project failure (see Exhibit 2). The same or similar reasons are mentioned again and again, resulting in a consistent, stable picture over time. All the ten causes of project failure listed by Winters (2003) are related to a lack of competencies and skills among project participants—either directly (e.g., “inadequately trained and/or inexperienced project managers” and “poor leadership”) or indirectly (e.g., “cultural and ethical misalignment” and “misalignment between the project team and the business or other organization it serves”), which can be solved or at least mitigated by better competencies.

Alexandrova & Ivanova-Stankova (2013) have also identified the competencies of the project manager and project team members as very important factors for the success of projects.

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PROPORTION* OF COMPANIES BY PROJECT SUCCESS RATES

Percentage of projects delivering expected value



* n = 1,284 respondents (556 senior executives and 728 project experts); regional distribution: North America (41%), Europe (26%), Asia (12%), South America (8%), Middle East (6%), Africa (4%), and Australia/New Zealand/Oceania (3%)

Source: T. K. HAMANN based on Nieto-Rodriguez (2021, pp. 6-14, 36-37)



Exhibit 1

TOP 10 REASONS PROJECTS FAIL

Inadequately trained and/or inexperienced project managers

Failure to set and manage expectations

Poor leadership at any and all levels

Failure to adequately identify, document and track requirements

Poor plans and planning processes

Poor effort estimation

Cultural and ethical misalignment

Misalignment between the project team and the business or other organization it serves

Inadequate or misused methods

Inadequate communication, including progress tracking and reporting

Source: Winters (2003)



Exhibit 2

Insufficient Quantity and Quality of Project Management Education

Unfortunately, companies struggle to find project-ready talent. They are in dire need of skilled people to successfully execute their projects. As the Society for Human Resource Management (SHRM) (2016), the world's largest HR professional association with approximately 285,000 members from over 165 countries, found in a large-scale member survey, there is a shortage of critical, application-oriented skills¹ in the job market. According to SHRM (2023, p. 23), only 16 percent of HR professionals reported seeing no applied skills deficiencies in applicants between February 2015 and January 2016. The most common complaint is the lack of (methodical) skills to think critically (analytically) and to develop solutions to problems, i.e., to cope with core tasks (see Exhibit 3). While basic skills (e.g., reading, writing, arithmetic, basic computer skills) form the basis for (further) learning, application-oriented skills enable the successful application of existing knowledge in the workplace and are therefore crucial.

In addition, the management consulting firm McKinsey & Company (2021a) reports that 87 percent of companies say they already have or will have a skills

gap by 2025. Higher education analyst and service provider QS Quacquarelli Symonds (2023, pp. 11–17) compared the importance employers place on various graduate skills with their satisfaction and identified a skills gap in the following areas, listed in descending order:

- Project management
- Data analysis
- Business development
- Resilience and flexibility
- Problem solving
- Emotional intelligence
- Communication
- Artificial intelligence
- Creativity
- Digital competency

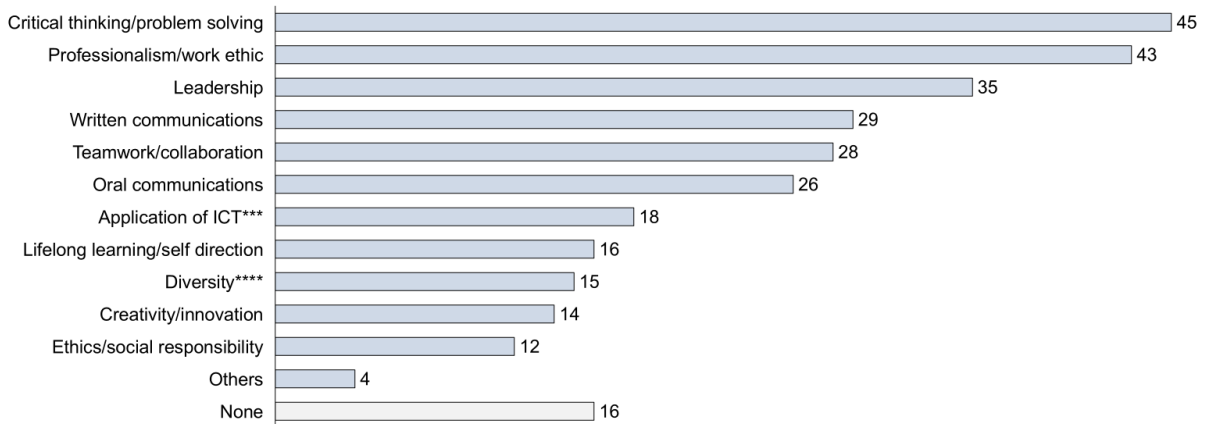
The fact that so many projects fail to deliver the expected success can be explained by a widespread lack of the necessary skills. What is the cause of this shortage and how can it be effectively addressed?

Graduates of a university or vocational training program do not automatically seem to have the skills needed for successful project management. For the study of business administration, Gloger (2016) generally finds that the knowledge imparted does not meet the (future) requirements of professional practice. It cannot be assumed

¹ While basic skills (e.g., reading, writing, arithmetic, basic computer skills) form the basis for (further) learning, application-oriented skills enable the successful application of existing knowledge in the workplace and are therefore crucial.

Examining Different Pathways for Acquiring Project Management Skills

APPLIED SKILL SHORTAGES AMONG JOB APPLICANTS IN THE LAST 12 MONTHS* – FREQUENCIES OF RESPONSES**



* Relative to February 2016

** n = 2,741 respondents (respondents who answered "don't know" were excluded from this analysis)

*** Information and communications technology, e.g., email, Internet research, word processing, spreadsheets, programming, social media

**** For example, the ability to work well with a diverse workforce and customer base

Source: Society for Human Resource Management (2016, p. 23)



Exhibit 3

that methods for developing solutions to problems and skills for successful project management are currently taught in business administration (and other subjects) to the required extent. This is most likely the reason for the low success rate of projects in practice, as mentioned above. Therefore, additional education or training is needed to ensure successful project management.

Major Types of Project Management Education: Overview

The range of project management training options is enormous, from short, topic-specific crash courses to seminars lasting several days and coaching over longer periods of time for working professionals. A search in the Internet search engine Google (as of May 06, 2023) with the search term “project management training” alone yields more than 4.5 million results. The large number of offerings makes it difficult to compare them and assess their quality. To make this easier, the following blog posts will comprehensively describe and evaluate the different basic

types of relevant training and education offerings.

We deliberately do not consider individual courses that cover only partial aspects of project management and thus provide only a fraction of the overall skills required for successful project management. Instead, we only consider programs that aim to train project managers so comprehensively that they can successfully manage projects in practice. Such programs include:

- Project management study programs at universities and business schools
- Project management certifications offered by various, often private, organizations
- Working as a management consultant, accompanied by numerous training courses and on-the-job coaching

Academic Degree Programs in Project Management

Various state-recognized universities in Germany and abroad (e.g., IU International University of Applied Sciences, Merseburg University of Applied Sciences, University of Sydney, and University of London) also offer bachelor's and master's

degree programs in project management. They usually take six (bachelor's) or four (master's) semesters to complete. There are also combined programs that combine project management content with subject-specific content from another field of study (e.g., business administration, business informatics or engineering) (Studis Online 2021).

The number of bachelor's and master's degrees in project management awarded worldwide between 2012 and 2020 is approximately 275,000,² which is a negligible 0.03 percent of the Project Management Institute's (2021a) estimate of 90 million project employees in project-related industries³ worldwide.

In the U.S., the private, for-profit University of Phoenix (3,652 degrees), the public Colorado State University Global (CSU Global) (1,767 degrees), and the private, for-profit Capella University (1,600 degrees) conferred the most project management degrees between 2014 and 2022 (T. K. HAMANN based on Data USA n.d.); all three are 4-year institutions, which are universities and some colleges that offer bachelor's or master's degrees. A total of 29,979 project management degrees⁴ were awarded in the U.S. during this period; Uni-

² According to an extrapolation by T. K. HAMANN based on data for the USA provided by the United States Census Bureau (2022), Data USA (n.d.), Organisation for Economic Co-operation and Development (OECD) (2022), and Barrow & Lee (2013)

³ Manufacturing & Construction, Information Services & Publishing, Finance & Insurance, Management & Professional Services, Utilities, and Oil & Gas

⁴ Across all relevant educational sectors: Public (4-year or above); private (not-for-profit, 4-year or above); private (for-profit, 4-year or above); public (2-year); private (not-for-profit, 2-year); private (for-profit, 2-year); public (less-than 2-year)

versity of Phoenix, CSU Global, and Capella University accounted for 12.2 percent, 5.9 percent, and 5.3 percent, respectively—nearly a quarter of all U.S. project management degrees (T. K. HAMANN based on Data USA n.d.). Although the University of Phoenix awards the most project management degrees in the U.S., Amberton University and CSU Global have the highest percentage of project management degrees (Data USA n.d.). In 2022, the most common project management degree in the U.S. was a master's degree (Data USA n.d.).

What are the relevant project management programs offered by the top three⁵ universities in the U.S.?

Founded in 1976, the University of Phoenix (n.d. a) is an online university for working adults. It offers two project management programs—the ACBSP⁶-accredited Bachelor of Science in Business with a Project Management Certificate and the Graduate Project Management Certificate; in addition, individual project management courses can be taken to build specific knowledge and skills (University of Phoenix n.d. b; n.d. c; n.d. d).

CSU Global (n.d. a; n.d. b) offers two academic degrees (bachelor's and master's) in project management, as well as an undergraduate and graduate certificate. The Master in Project Management is designed to enable graduates to manage complex

modern projects from initiation to completion. In addition, the program is fully online, allowing students to work full-time, spend time with family and friends, and complete the rigorous course of study. Colorado State University Global's (n.d. b) Master in Project Management program is aligned with the Project Management Institute's scope of knowledge and prepares students the Project Management Professional (PMP)[®] certification exam.

Capella University (n.d. a; n.d. b) also offers two academic degrees—Bachelor of Science in Business with a specialization in Project Management, Master of Business Administration (MBA) in Project Management. As with the other two universities, these programs are designed for busy, working adults and are therefore online (Capella University n.d. c; n.d. d; n.d. e).

Project Management Certifications

The Project Management Institute (PMI) (2021a) estimates the number of project management-oriented employees in project-related industries worldwide at approximately 90 million. If a project team consists of an average of eight people (own assumption based on Harrin 2022), we can assume a total of approximately 11 million

⁵ In terms of the number of project management degrees awarded

⁶ Accreditation Council for Business Schools and Programs

projects that can be worked on simultaneously, so that—assuming an even distribution—a project management certificate holder works on almost half (46 percent) of the projects. Between 57 and 66 percent of all companies use the PMBOK® Guide (T. K. HAMANN based on data in Project Management Solutions 2022), which is the standard for project management and the basis for the certification of traditional project management methods by the Project Management Institute. In addition, 71 percent (Wellington 2021) to 82 percent (Statista 2021) of organizations have established a Project Management Office (PMO) with nearly half of its employees certified as Project Management Professionals (PMP)®.

Nevertheless, according to a survey by 4PM (as cited in Kuuse 2019), 70 percent of projects in most organizations fail, and the main reason is poor project management. According to studies, as many as 75 percent of organizational change initiatives fail (Spencer & Watkins 2019); Burke (2024) reports that as many as 88 percent of business transformations fail to achieve their original goals. This means that many projects fail despite the involvement of project management certificate holders. Various scientific studies (e.g., Nazeer & Marnewick 2018; Dehghanpour Farashah, Thomas & Blomquist 2019) have not empirically demonstrated a relationship between certification and project management performance. According to Catanio, Armstrong & Tucker (2013), certified project managers are no better at managing project scope, time and cost than certification. Blomquist,

Dehghanpour Farashah & Thomas (2018) conclude in their study that the benefit of project management certifications is more about appearing good than being good.

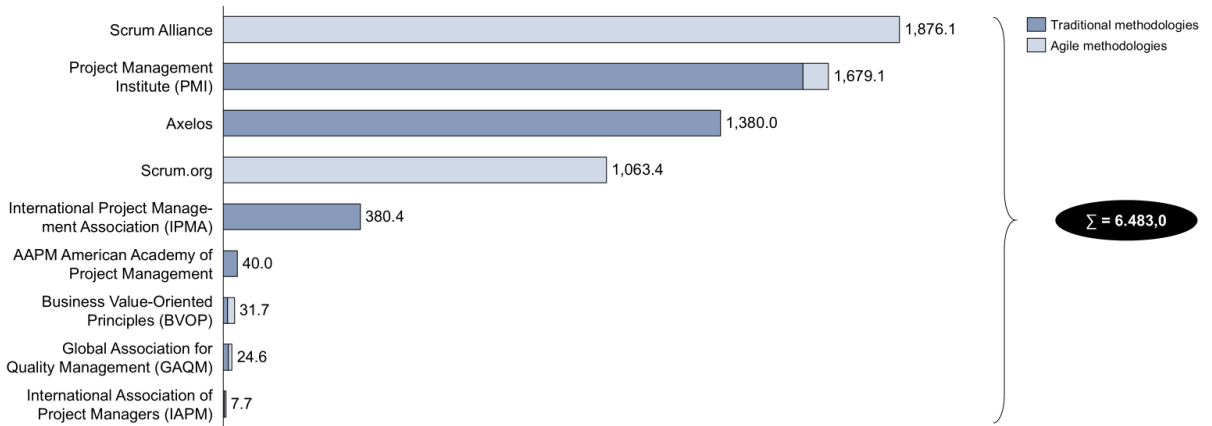
They add that while certification is still an important career step because it is so well established in the job market, one should be very aware of the need for other forms of training to become a truly good project manager. This fact is probably not known by many hiring managers and clients of consulting firms. In the hope of achieving the most efficient selection processes possible, they are increasingly using (voluntary) certificates as an indicator of the competencies and likely future performance of candidates or consultants, which increases the value of the certification for the holders and thus further drives the growth of the certification business (Dehghanpour Farashah, Thomas & Blomquist 2019). Certified project managers also receive higher compensation. According to the Project Management Institute (2021b), the average salary of PMI-PMP®s in Europe is 14 percent higher than their counterparts without this certification, and 16 percent higher worldwide.

The most common project management certifications are those of the Project Management Institute (see Exhibit 4). Of these 1,679,143 certifications, the Project Management Professional (PMP)® is the most common, with 1,496,758 awarded (see Exhibit 5), or 89.1 percent of all credentials awarded by the Project Management Institute. According to the Project Management Institute's self-promotion (n.d. a),

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NUMBER OF PROJECT MANAGEMENT CERTIFICATIONS BY CERTIFICATION BODY*

IN THOUSANDS OF CERTIFICATES



* Unfortunately, the list is not complete. For example, the Institute of Project Management did not provide any data.

Source: Scrum Alliance (n.d.); T. K. HAMANN based on Project Management Institute (2025) and Leparulo (2024); T. K. HAMANN based on Monappa (2022) and Buehring (2023); Scrum.org (2025); T. K. HAMANN based on Janssens (2023) assuming the same growth rates as for the PMI certificates; Mentz (2025); T. K. HAMANN based on BVOP (2023) assuming the same growth rates as for the IPMA certificates; GAQM (2025a, 2025b); T. K. HAMANN based on IAPM (n.d. a, n.d. b)

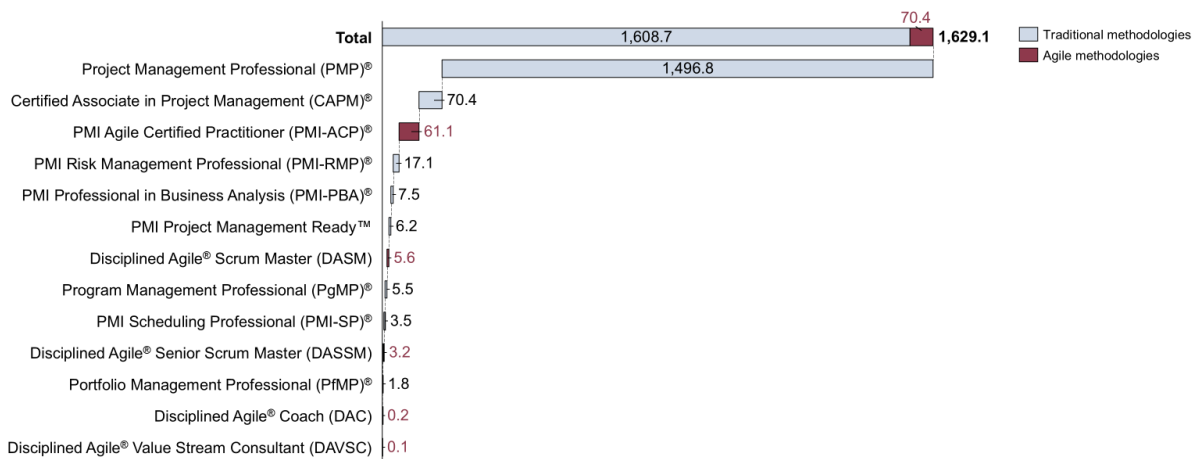


Exhibit 4

NUMBER OF PROJECT MANAGEMENT CERTIFICATIONS ISSUED BY THE PROJECT MANAGEMENT INSTITUTE (PMI), GLOBALLY

AS OF DECEMBER 31, 2024

IN THOUSANDS OF CERTIFICATES



Source: T. K. HAMANN based on Project Management Institute (2025) and Leparulo (2024) assuming the same proportions of the various PMI certificates as of December 31, 2023



Exhibit 5

“PMP is the gold standard in project management certification;” moreover, the PMI-PMP® holder can “[d]emonstrate [his/her] ability to lead projects in any industry with this globally recognized certification.” To obtain the PMP® certification, you must meet certain eligibility requirements and successfully pass a 180-question exam (Project Management Institute n.d. a). There are two ways to prepare for the exam—either by taking the online self-learning prep course or by attending a live online or in-person training taught by an authorized provider (Project Management Institute n.d.; PS Consulting n.d.). The Project Management Institute’s (n.d. b) Project Management Professional (PMP)® certification, which is further examined here, is intended for experienced practitioners with more than three years of work experience.

Working as a Top-Tier Management Consultant

Management consultants help organizations solve problems and manage change (e.g., targetjobs n.d.). They typically provide these services to their clients in the form of projects, making project work part of the essence of management consulting (Deltek 2022). To best meet the challenges associated with consulting projects, the so-called top-tier consultancies, such as

McKinsey & Company and the Boston Consulting Group (BCG) often referred to as “CEO factories,” these consulting firms are replacing the best MBA programs in training the next generation of leaders (Loos 2019). Indeed, when former consultants have taken the helm as CEOs, they have been able to improve the situation of their company more often (in 71 percent of cases) than executives without a consulting background (42 percent) (Gavett 2013; see Exhibit 6). Thus, working (for several years) for one of the top consulting firms is a kind of formal qualification, or as former McKinsey consultant Paul W. Chelgren put it (in Byrne 1993): “You got your BS, your MBA, and your McK.”

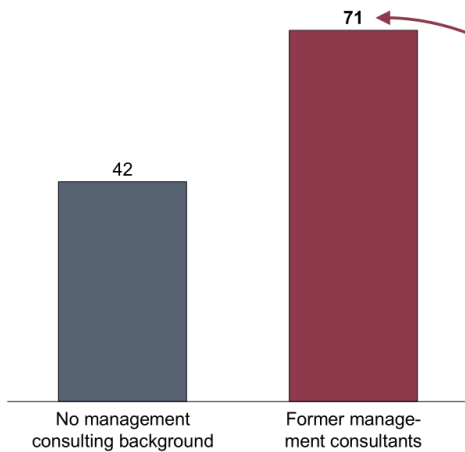
Some companies, especially the large international consulting firms, provide internal training to their employees, primarily in project management. These companies offer training programs tailored to the needs of different career levels, with internal and external trainers and coaches. Participation in these programs is partly mandatory and partly optional⁸ (see Exhibit 7). Compared to other firms, top-tier consultancies invest heavily in the training of their consultants (see Exhibit 8). The training program at McKinsey & Company (n.d. d) requires consultants to complete five to nine weeks of training in the first two years alone. The formal training programs are systematically supplemented by extensive on-the-job men-

⁷ From Business Analyst/Junior Consultant to (Senior) Consultant, (Senior) Project Manager to (Senior) Partner

⁸ For example, in the case of specific development needs based on an individual profile of strengths and weaknesses or personal interests

Examining Different Pathways for Acquiring Project Management Skills

PROPORTION OF CEOs WHO IMPROVED THE CONDITION OF THEIR COMPANY DURING THEIR TENURE IN PERCENT



RELEVANT SKILLS

Former management consultants ...

- ... are trained to analyze and solve problems and focus on increasing the value of a business
- ... work under pressure—they quickly focus on the most important levers
- ... can connect complex issues and develop comprehensive, phased programs of action
- ... are adept at communicating complex ideas in a simple way, telling a story that can be understood and remembered, and embedding recommended actions in a central strategic framework that clarifies the direction of the company's development

Source: Gavett (2013); T. K. HAMANN



Exhibit 6

TYPICAL NUMBER OF FORMAL TRAINING PROGRAMS AT TOP-TIER CONSULTING FIRMS

Career stage	Mandatory	Optional
(Senior) Partner	1	3
Principal	1	1
Project Manager	2	3
Senior Consultant	3	1
(Junior) Consultant/ Business Analyst	2	11

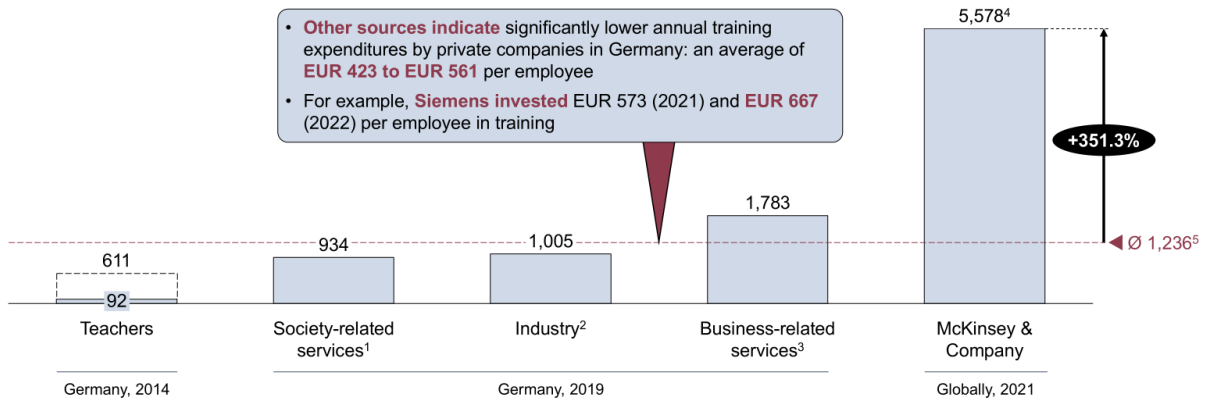
Source: T. K. HAMANN



Exhibit 7

Examining Different Pathways for Acquiring Project Management Skills

ANNUAL INVESTMENT IN CONTINUING VOCATIONAL TRAINING BY INDUSTRY IN EUR PER EMPLOYEE



¹ Retail, Hospitality; Health & Social Services; Education; Veterinary Affairs; Cultural, Sports & Entertainment Services; Other Services

² Manufacturing; Energy & Water Utilities; Waste Management; Construction

³ Wholesale; Transport & Warehousing; Information & Communication; Banking; Insurance; Financial Services; Real Estate; Legal, Tax & Management Consulting;

⁴ Advertising; Market Research; Rental of Movables; Employee Leasing; Cleaning; Security; Architectural & Engineering Services; Research & Development

⁵ Based on the exchange rate from March 3, 2022, 1:21 pm (CET): EUR 1.00 \triangleq USD 1.1095

⁶ Germany 2019 mean

Source: Daschner (2019, p. 15); Seyda & Placke (2020, pp. 107–111); McKinsey & Company (n.d. a, n.d. b); finanzen.net (2022); Lin-Klitzing (2022); Siemens (n.d.)



Exhibit 8

toring during daily project work and support from experienced colleagues. Due to the very demanding hiring criteria of top-tier consultancies, the requirements for passing these internal training courses are correspondingly high.

Major Types of Project Management Education: Detailed Description

A systematic comparison of the forms of project management training and professional development described above highlights their respective strengths and weaknesses, thus identifying areas for improvement. As the characteristics of the many different courses of study, in-house training and further education programs, and project management certificates vary greatly, three selected programs will be compared below, one each representing one of the three categories. The selection of these programs was based on their prevalence within the respective categories, their

Examining Different Pathways for Acquiring Project Management Skills



format, their content (with project management as a core focus rather than a minor subject), and their quality standards.

Key Formal Hire/Admission Requirements

Exhibit 9 summarizes the key formal minimum requirements for the three basic routes to project management education. As an example of the project management education, one receives by working at a top-tier consulting firm, the role of an Associate at McKinsey & Company is used because they are the largest of the three tier-one consultancies and therefore hire the highest number new consultants. Since the most

common academic degree in project management in the U.S. is a master's degree (Data USA n.d.), this category is represented by the corresponding master's program at the university that awards the most project management degrees in absolute terms, which is Colorado State University Global (CSU Global). In addition, project management certifications are exemplified by the Project Management Institute's Project Management Professional® (PMI-PMP®), one of the most widely awarded project management certifications with almost 1.5 million active certificate holders. Overall, the PMI-PMP® has the lowest entry requirements in terms of minimum education.

MINIMUM FORMAL REQUIREMENTS FOR VARIOUS ROUTES TO PROJECT MANAGEMENT EDUCATION

	 McKinsey & Company: Associate	 CSU Global: Master in Project Management	 Projekt Management Institute: Professional in Project Mgmt.
Minimum level of education	Advanced graduate degree (e.g., MBA, PhD)	Bachelor	High school or secondary school diploma
Minimum grade point average	"Outstanding"*	3.00 (on a scale of 0.00 to 4.00)	—
Work experience	—	—	24–60 months** experience leading and managing projects within the past eight years
Others	Multi-stage selection process with interviews and case studies	—	—

* No strict grade point average (GPA) cutoff, but 3.60 or higher (on a scale of 0.00 to 4.00) is considered a strong GPA

** 24 months with a bachelor's degree or higher (or global equivalent) from a program accredited by the Global Accreditation Center for Project Management Education Programs (GAC); 36 months with a bachelor's degree or higher (or global equivalent); and 60 months with a high school diploma or equivalent

Source: T. K. HAMANN based on McKinsey & Company (n.d. a; n.d. c); Randall (2025); CSU Global (n.d. b); and Project Management Institute (n.d. a; n.d. b)

Academic Degree Programs in Project Management

According to Data USA (n.d.), the top three universities in the U.S. in terms of the number of project management degrees awarded are:

- University of Phoenix
- Colorado State University Global (CSU Global)
- Capella University

The University of Phoenix's (n.d. d) Bachelor of Science in Business with Project Management Certificate follows the general admission requirements for Bachelor of Science programs. These consist primarily of an acceptable official high school diploma;⁹ in the case of a recognized school leaving certificate from a non-English-speaking country, a language test such as the Test of English as a Foreign Language (TOEFL) is also required (University of Phoenix n.d. e). An essay and college entrance exams such as the Scholastic Aptitude Test (SAT), American College Test (ACT), Graduate Management Admission Test (GMAT), or Graduate Record Examination (GRE) are not required (University of

Phoenix n.d. f). The Project Management Certificate can be obtained in addition to the bachelor's degree by taking the additional course Leadership Business Analytics but does not require any further admission requirements (University of Phoenix n.d. d).

The Project Management Certificate can also be earned outside of the bachelor's program—in an undergraduate or graduate version, both of which require a bachelor's degree or higher¹⁰ as a prerequisite for admission (University of Phoenix 2025, pp. 364, 373).

To be admitted to Colorado State University Global's (n.d. c) online Bachelor of Science in Project Management program, you must have at least two years of work experience and a high school diploma with a minimum grade point average (GPA) of 2.80 (on a scale of 0.00 to 4.00) or a certain score on the College Board's General Educational Development Test (GED) or, as an alternative to the GED, a Higher Education Admission Recommendation (HEAR) for rigorous requirements with at least C grades in high school courses.¹¹

⁹ Alternatively, a state-sanctioned U.S. high school equivalency diploma, or foreign secondary school equivalent may be accepted. Under certain conditions, a U.S. high school diploma is recognized in Germany as a subject-related entrance qualification for universities of applied sciences [Fachhochschulreife] or as a general university entrance qualification [allgemeine Hochschulreife] (Kultusministerkonferenz – Zentralstelle für ausländisches Bildungswesen n.d. a).

¹⁰ A bachelor's degree or higher from a college or university with approved institutional accreditation, or that is a candidate for accreditation, or comparable bachelor's degree or higher earned at a recognized foreign institution or a master's degree or higher from an institution that is accredited by the American Bar Association (ABA), i.e., Juris Doctor (JD), Legum Baccalaureus (LLB), Legum Magister (LLM).

¹¹ If the applicant does not meet the requirements for regular admission, provisional admission may be granted if certain minimum requirements are met. Final admission of provisionally admitted students is contingent upon satisfactory academic progress.

Admission to the master's program at Colorado State University Global (n.d. d) requires a bachelor's degree from a regionally accredited institution with a minimum GPA of 3.00 (on a scale of 0.00 to 4.00); applicants with a bachelor's GPA below 3.00 may be admitted with a master's degree if it has a GPA of at least 3.00.¹³ Thus, you will need either a bachelor's or master's degree with a GPA of 3.00 (equivalent to the German grade 2.0 or "good") or better.

Capella University (n.d. f; n.d. g) requires a high school diploma or equivalent and 4.5 transferable credits¹² for admission to the Bachelor of Science (Project Management) program; SAT and ACT are not required for admission. In addition, international students must have a minimum score on an acceptable test to demonstrate English proficiency (Capella University n.d. f).

For the MBA in Project Management, a bachelor's degree from an institution accredited by a U.S. Department of Education-recognized agency or from an internationally recognized educational institution (with a minimum GPA of 2.30 or higher on a scale of 0.00 to 4.00); GRE and GMAT are not required for admission (Capella University n.d. i). International students must also achieve a minimum score on an acceptable English proficiency test,

such as the TOEFL (Capella University n.d. i; n.d. j).

Project Management Certifications

The PMI-PMP® is one of the most widely awarded project management certifications with almost 1.5 million active certificate holders.

To register for the PMI-PMP® exam, you need a 4-year degree, i.e., a bachelor's degree from a university or university of applied sciences, as well as 36 months of experience in managing projects within the last eight years; alternatively, a high school diploma (A levels), an associate's degree¹³ or a completed vocational training and 60 months of experience in managing projects within the last eight years (Project Management Institute n.d. e; Fuchs & Consorten Unternehmensberatung n.d. a).

However, according to the authorized PMI training partner Fuchs & Consorten Unternehmensberatung (n.d. b), the verification of practical project management experience seems to be handled rather laxly: The Project Management Institute expects a description of the leading activities in the form of at least 100 words. Only in very rare cases could the information be verified in detail. In this case, the information would

¹² "Credit awarded from an academic institution or program that was accredited prior to the applicant's withdrawal from the institution; undergraduate coursework completed with a grade of 'C-' or better; graduate coursework completed with a grade of 'B-' or better" (Capella University n.d. h)

¹³ If the applicant does not meet the requirements for regular admission, provisional admission may be granted if certain minimum requirements are met. Final admission of provisionally admitted students is contingent upon satisfactory academic progress.

need to be certified in writing. The applicant could provide one or more contacts to confirm the project information. It is not necessary to specify projects at the management level, but project participation is sufficient—although (formal) project leadership/management experience is required.

Working as a Top-Tier Management Consultant

The formal requirements to become a management consultant at one of the three tier-one consulting firms, McKinsey & Company, Boston Consulting Group (BCG), and Bain & Company, and to receive extensive project management training are very high.

For example, to join McKinsey & Company (n.d. e; n.d. f; n.d. g) as a permanent “allrounder,” i.e., as a consultant who is not assigned to a (functional) practice, you need an excellent/above-average university degree (e.g., bachelor, Master of Business Administration, PhD)¹⁴ or equivalent professional experience (usually more than five years).¹⁵ If you are invited to an interview based on your application, this is followed by a multi-stage selection process that takes

place over several days and focuses on discussions (experience/expertise interviews) and case studies (case interviews) with consultants¹⁶ as well as the digital McKinsey assessment game “Solve” (McKinsey & Company n.d. h; n.d. i; n.d. j). The same is true of other top-tier consultancies such as Boston Consulting Group (BCG) and Bain & Company.

Time Spent Learning/In Training

Exhibit 10 shows the typical learning time for the different project management education paths. While working as a consultant at a top-tier consulting firm takes about 1,800 hours of learning, and MBA project management programs require a similar amount of study time (1,350 to 1,728 hours), a candidate for the Project Management Institute’s Project Management Professional® (PMI-PMP®) credential spends only 105 hours studying—including 70 hours working through the exam questions. This means that a PMI-PMP® candidate must spend about 94 percent less learning time than a McKinsey consultant spends on average in 2.5 years (or an MBA

¹⁴ The specialization does not matter; an economics background is not a requirement (McKinsey & Company n.d. f). In Germany, it is possible to join at different career levels—with a bachelor’s degree as a Junior Fellow, who moves into the so-called Fellowship Program after one year (McKinsey & Company n.d. i); with a university diploma or master’s degree as a Fellow in the so-called Fellowship Program, in which one first works as a consultant for two years and then, typically with appropriate performance, is released to pursue a master’s or PhD (with full pay for one year) (McKinsey & Company n.d. j); with a PhD, MBA or relevant professional experience as an Associate (McKinsey & Company n.d. j); or with—ideally two—university degrees and relevant professional experience as an Experienced Consultant (McKinsey & Company n.d. k)

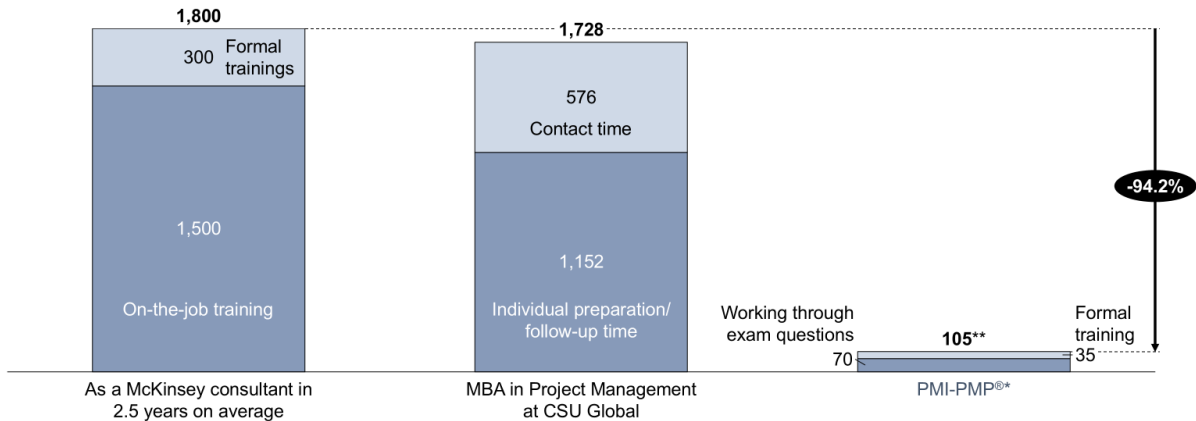
¹⁵ Requirements may vary by country or practice group

¹⁶ Not all McKinsey interviews involve case studies or follow a specific format.

Examining Different Pathways for Acquiring Project Management Skills

TOTAL TIME SPENT LEARNING FOR DIFFERENT FORMS OF PROJECT MANAGEMENT EDUCATION

IN HOURS



* Project Management Institute's (PMI) Project Management Professional (PMP®)

** Although practical experience in leading and managing projects is required as an admission requirement, i.e., experience acquired outside the PMI-PMP® program, it is difficult to prove, and the quality of the learning cannot be assessed. Therefore, this is not considered informal learning time here.

Source: T. K. HAMANN based on Lexware.de (n.d.); McKinsey & Company (n.d. d); Anonymous (2013); Byrne (2018); and Loos (2023); CSU Global (n.d. b; n.d. d); U.S. Department of Education (2018); Project Management Institute (n.d. e); Fuchs & Consorten Unternehmensberatung (n.d. c)



Exhibit 10

student throughout his or her studies) and—like preparing for the German driver’s license test—is mainly concerned with memorizing the pre-defined exam questions rather than learning how to deal with often unexpected and unstructured issues and new challenges.

Academic Degree Programs in Project Management

The Master in Project Management from Colorado State University Global (n.d. b) requires a total of 36 credits, of which 24 are core courses and 12 are specialization courses. One credit equals one hour of contact time per week and two hours of individual preparation/follow-up time per week over a 16-week semester, for a total of

16 hours of contact time and 32 hours of student preparation/follow-up time (CSU Global n.d. e; U.S. Department of Education 2008). To earn 36 credits, 1,728 hours of study are required—assuming full-time study with five eight-hour days per week, this equates to 216 study days or 43 weeks, of which 72 study days, or 14 study weeks are course contact time and 144 study days, or 29 study weeks are individual study time.

The Master of Business Administration in Project Management at Capella University (n.d. k) requires a total of 45 quarter credits in the so-called GuidedPath¹⁷—at least 24 quarter credits in the category of core courses, at least 16 quarter credits from the specialization courses, and five quarter credits for the com-

pletion of a capstone course in the last quarter. Typically, one credit requires three hours of study per week (U.S. Department of Education 2008). Quarter courses at Capella University last ten weeks (Capella University n.d. k), so a total of 1,350 hours (= 45 credits × 3 hours/week × 10 weeks) of study can be expected for the MBA program—assuming full-time study with five eight-hour days per week, this equates to 169 study days or 34 weeks.

Project Management Certifications

To register for the Project Management Professional (PMP)[®] exam, a candidate must have completed 35 hours of project management training or hold the Certified Associate in Project Management (CAPM)[®] credential and have completed at least 23 contact hours of project management training (Project Management Institute n.d. e; n.d. f). According to Fuchs & Consorten Unternehmensberatung (n.d. c), a total of 70 hours of additional in-depth work is required to work through a catalog of exam questions. Thus, a total preparation time of 105 hours can be assumed, which corresponds to approximately 13 eight-hour working days.

Working as a Top-Tier Management Consultant

On average, a consultant at a top-tier consulting firm like McKinsey & Company leaves the firm after about 2.5 years (Anonymous 2013; Loos 2023). By this time, a consultant has typically developed all the transferable skills that are in demand on the labor market (Movemeon n.d.). As a consultant at McKinsey & Company (n.d. d), you complete five to nine weeks of training in the first two years. Assuming an average of 7.5 weeks of formal training over the 2.5 years that a consultant typically stays with a tier-one consulting firm, this equates to a total of 300 hours.

According to Byrne (2018), MBAs working at McKinsey & Company reported working an average of 72 hours per week, while the average was 63 hours per week at Boston Consulting Group (BCG) and 58 hours per week at Bain & Company. After deducting the usual absences for vacation, illness, etc., it can be assumed that there are about 42 working weeks per year (Lexware.de n.d.). Multiplying this figure by an assumed 60 hours per week gives an average working time of 2,520 hours per year. Over 2.5 years of consulting, this amounts to 6,300 working hours, from which the 300 hours of formal training must be subtracted, leaving 6,000 working hours. Of course, this remaining working time consists not only of learning experi-

¹⁷ FlexPath learning time is comparable to GuidedPath (Capella University n.d. k).

Examining Different Pathways for Acquiring Project Management Skills

ences, but also, for example, of some well-known analytical activities that do not teach you very much. However, the actual project work is “learning by doing” with guidance and regular feedback from more senior team members (Case Interview Hub 2023), so that a high degree of learning can be expected in the daily work routine. Typically, the learning curve is very steep in the first few years as a management consultant. Under the assumption that approximately 25 percent of work time is spent acquiring new skills and building knowledge, the first 2.5 years as a management consultant involve 1,500 hours of informal learning time.

Learning Content/Curriculum

Academic Degree Programs in Project Management

CSU Global’s Master in Project Management program consists of a total of nine core courses (three credits each)—six required courses (see Exhibit 11) and three elective courses (see Exhibit 12), two of the latter must be taken. The content of each core course is shown in Exhibits 11 and 12. In addition, students must choose a specialization, which consists of four specialization courses for a total of 12 credits. The specializations offered are shown in Exhibit 13.

CSU GLOBAL: ONLINE MASTER’S IN PROJECT MANAGEMENT—REQUIRED CORE DEGREE COURSES

Effective Organizations: Theory and Practice	<ul style="list-style-type: none"> Organizational theory Strategic thinking 	<ul style="list-style-type: none"> Decision-making Leadership 	<ul style="list-style-type: none"> Organizational culture Change management
Project Management	<ul style="list-style-type: none"> Management of teams, schedule, risks, and resources to effectively achieve project objectives from time, cost, and quality perspectives 		<ul style="list-style-type: none"> Case studies about negotiating, selecting, initiating, planning, budgeting, scheduling, monitoring, controlling, and terminating a project
Contracts, Procurement, and Risk management	<ul style="list-style-type: none"> Risk management planning Risk identification Risk analysis 	<ul style="list-style-type: none"> Risk-response strategies Risk monitoring Risk control 	<ul style="list-style-type: none"> Responsibilities in identifying/obtaining resources from vendors Legal requirements Contracting processes
Project Metrics, Monitoring, and Control	<ul style="list-style-type: none"> Measurement-driven project management Effective monitoring and controlling of projects Proper use/communication of project performance metrics 		<ul style="list-style-type: none"> Project management metrics Key performance indicators (KPI) Dashboards
Capstone	<ul style="list-style-type: none"> Analysis of project objectives in relation to budget, schedule, and scope to propose a project with a full plan of implementation (incl. strategies for overcoming challenges) 		<ul style="list-style-type: none"> Utilization of skills to demonstrate the ability to plan and implement project from conception to conclusion
Operations Management	<ul style="list-style-type: none"> Quality management Design and production of goods and services 	<ul style="list-style-type: none"> Effective supply chains and virtual chains Product life cycles 	<ul style="list-style-type: none"> Design and management of processes to develop and improve production and resource planning Tools for supply chain management

Source: T. K. HAMANN based on Colorado State University Global (n.d. b; 2023; 2025)



Exhibit 11

Examining Different Pathways for Acquiring Project Management Skills

CSU GLOBAL: ONLINE MASTER’S IN PROJECT MANAGEMENT—ELECTIVE* CORE DEGREE COURSES

Business Analysis*	<ul style="list-style-type: none"> • Case studies on analyzing business situations, developing requirements, and translating user needs into technology and engineering specifications for development teams 	<ul style="list-style-type: none"> • Assessment and Integration of project requirements in relation to user needs and organizational goals
Agile Project Management*	<ul style="list-style-type: none"> • Fundamental and practical aspects of the agile approach (e.g., highlighting the value of customer focused adaptive planning, and collaborative effort) 	<ul style="list-style-type: none"> • Case studies and examples on practical industry-standard tools and techniques
Project Management Office (PMO)*	<ul style="list-style-type: none"> • Elements of a PMO, which includes defining and maintaining standards, policies, processes, and methods for project management 	

* At least 2 of the 3 must be completed

Source: T. K. HAMANN based on Colorado State University Global (n.d. b; 2023; 2025)



Exhibit 12

CSU GLOBAL: ONLINE MASTER’S IN PROJECT MANAGEMENT—SPECIALIZATIONS*

Most Popular Specializations	<ul style="list-style-type: none"> • Organizational Leadership and Change Management • Strategic Innovation and Change Management • Human Resource Management • Finance • Organizational Learning and Performance • Applied Business Management
Additional Available Specializations	<ul style="list-style-type: none"> • Accounting • Artificial Intelligence and Machine Learning • Business Intelligence • Criminal Justice Leadership • Global Management • Healthcare Administration • Human Resource Management • Information Technology • International Management • Population Health

* Each consists of four specialization courses

Source: T. K. HAMANN based on Corporate State University Global (n.d. b)



Exhibit 13

Examining Different Pathways for Acquiring Project Management Skills

At Capella University, the Master of Business Administration in Project Management program is similarly structured. It includes a total of six core courses (four quarter credits each) covering various business topics that must be taken. In addition, four courses in the project management specialization must be taken (four quarter credits each). Furthermore, students must integrate the knowledge and skills acquired in the MBA program into an application-based business project, which may be a project from their own professional experience. The Project Management Foundations course teaches, among other things, the methodologies defined by the Project Management Institute

(Capella University n.d. b; n.d. k). The corresponding learning content is shown in Exhibits 14 and 15.

Overall, the learning content of the two programs considered here is very similar. In particular, the capstone courses are designed to ensure a certain degree of application.

CAPELLA UNIVERSITY: MASTER OF BUSINESS ADMINISTRATION IN PROJECT MANAGEMENT—REQUIRED CORE COURSES

MBA Leadership	<ul style="list-style-type: none"> Contemporary Models of Leadership 	<ul style="list-style-type: none"> Behaviors and skills of effective leaders 	<ul style="list-style-type: none"> Assessment of own leadership strengths Ways in which leaders use their skills to support innovation, change, and collaboration within organizations
Applied Business Analytics	<ul style="list-style-type: none"> Introduction to business analytics and its role in evidence-based decision making 		<ul style="list-style-type: none"> Examination of data and analytics techniques that create relevant, actionable, and meaningful information
Accounting Methods for Leaders	<ul style="list-style-type: none"> Use of financial and managerial accounting to analyze business performance and make evidence-based business decisions 		<ul style="list-style-type: none"> Examination of tax, ethical, and legal implications of accounting methods
Applied Managerial Finance	<ul style="list-style-type: none"> Financial concepts and techniques required to evaluate, report, and maximize firm performance and value Analysis of environmental/market factors, goals, and constraints 		<ul style="list-style-type: none"> Application of regulatory and ethical principles and business analytics skills to drive data-based decision making
Operations Management for Leaders	<ul style="list-style-type: none"> Theories and models of business operations and their role in developing and delivering a superior product or service to the marketplace 		<ul style="list-style-type: none"> Application of business analytics skills and use data to evaluate strategic and tactical impact to business functions across the organization
Business Strategy	<ul style="list-style-type: none"> Examination of ways in which companies formulate and implement strategy to effectively compete in the marketplace 		<ul style="list-style-type: none"> Application of strategic models and analysis to address competitive challenges

Source: T. K. HAMANN based on Capella University (n.d. k)

Examining Different Pathways for Acquiring Project Management Skills

CAPELLA UNIVERSITY: MASTER OF BUSINESS ADMINISTRATION IN PROJECT MANAGEMENT—REQUIRED SPECIALIZATION COURSES & CAPSTONE

Project Risk Assessment and Control	<ul style="list-style-type: none"> • Components of project risk management including assessing project risk identification and mitigation strategies • Evaluation of risk impact analysis methods 	<ul style="list-style-type: none"> • Evaluation of risk analysis techniques to ensure project success • Assessment of project risk management certifications and professional development activities
Project Management Planning, Execution, and Control	<ul style="list-style-type: none"> • Components of project management within the project planning, executing, monitoring, and controlling process groups • Application of various project management tools 	<ul style="list-style-type: none"> • Identification of project requirements and development of a project plan that considers project scope, time, and cost in managing competing project requirements
Project Budgeting, Procurement, and Quality	<ul style="list-style-type: none"> • Investigation of project cost, quality, and procurement in business or information technology (IT) project context 	<ul style="list-style-type: none"> • Fundamental concepts and principles of various project management knowledge areas, e.g., project cost management • Application of relevant tools, techniques, and methodologies
Project Management Foundations	<ul style="list-style-type: none"> • Cross-disciplinary course • Project management fundamentals and standards, with an emphasis on management methodologies and frameworks 	<ul style="list-style-type: none"> • Opportunity to participate in experiential learning by bringing in a workplace project • Cultivation of effective project management leadership skills
MBA Capstone Experience	<ul style="list-style-type: none"> • Integration of the knowledge and skills gained during the MBA program in an application-based business project 	<ul style="list-style-type: none"> • Identification and deriving recommendations of evidence-based solutions to business challenges and opportunities

Source: T. K. HAMANN based on Capella University (n.d. k)



Exhibit 15

Project Management Certifications

According to the Project Management Institute (n.d. g), the 35 hours of training required to become a certified Project Management Professional (PMP)[®] can be completed either through an authorized online self-study course or by attending an instructor-led course offered by an authorized training partner. One such authorized training partner is Fuchs & Consorten Unternehmensberatung, which offers PMP[®] preparation courses under the IfP Institute for Project Management Düsseldorf brand. Exhibit 16 shows the content of the

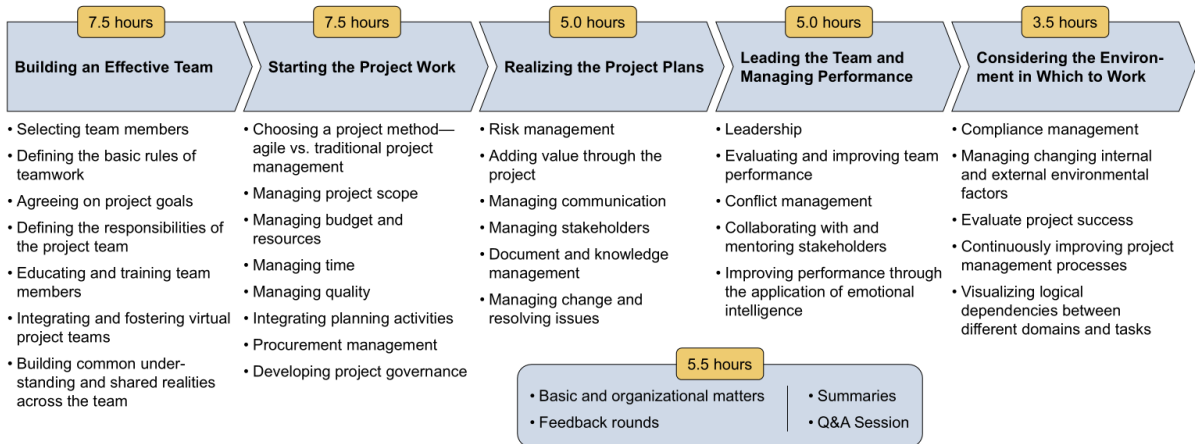
four-day course, organized according to five topic areas.

The questions in the certification exam are based on the content of the sixth and seventh editions of the PMBOK[®] Guide (Fichtner 2022). The seventh edition of the PMBOK[®] Guide presents an integrated framework of eight so-called Project Performance Domains¹⁸ and describes approaches for tailoring these to specific questions. This means that a PMI-PMP[®] candidate must spend about 94 percent less learning time than a McKinsey consultant spends on average in 2.5 years (or an MBA

¹⁸ Stakeholder, Team, Development Approach and Life Cycle, Planning, Project Work, Delivery, Measurement, and Uncertainty

Examining Different Pathways for Acquiring Project Management Skills

PMI-PMP® PREPARATION COURSE: CONTENT



* According to the original source, the total length is 34 hours instead of the required 35 hours
 Source: T. K. HAMANN based on Fuchs & Consorten Unternehmensberatung (n.d. d)



Exhibit 16

student throughout his or her project needs, as well as commonly used models, methods and artefacts¹⁹ (Project Management Institute 2021). In contrast, previous editions were process-oriented (Project Management Institute 2021c, pp. x–xi); this perspective has now been described in a practice guide entitled *Process Groups: A Practical Guide to supplement the PMBOK® Guide* (Project Management Institute n.d. h). However, according to the PMI (2020a, p. 1), there are differences between

the content (and structure of the PMP® exam and the PMBOK® Guide; the exam is structured around three domains:

- People (42 percent of the exam questions)
- Processes (50 percent of the exam questions)
- Business environment (8 percent of the exam questions)

After successful certification, a certain number of Professional Development Units (PDUs)²⁰ must be earned within a three-year

¹⁹ “A model is a thinking strategy to explain a process, framework, or phenomenon. A method is the means for achieving an outcome, output, result, or project. An artifact can be a template, document, output, or project deliverable.” (Project Management Institute 2021, p. 153)

²⁰ For the PMI-PMP®, a total of 60 PDUs (Project Management Institute 2022, p. 4)

Examining Different Pathways for Acquiring Project Management Skills

cycle to maintain certification; PDUs are one-hour blocks of time spent learning, imparting relevant knowledge or relevant unpaid commitment (Project Management Institute n.d. i; n.d. j). The 60 PDUs required to maintain the PMI-PMP® credential can be earned through two areas of activity as defined by the Project Management Institute (n.d. i; n.d. j; n.d. k; 2022, p. 4):

- Education (through project management courses and training, attendance at global and local events and conferences, self-directed learning online or through various forms of digital media, self-directed reading, or informal learning)
- Giving Back to the Profession (by working as a practitioner, creating content such as articles or blogs, mentoring or teaching others, or volunteering with PMI)

At least 35 of the 60 PDUs must be earned through Education, but all the required 60 PDUs can be earned through Education only (Project Management Institute 2022, p. 4). Within the Education category, there are three areas, known as the Talent Triangle, from which a minimum of eight PDUs must be earned:²¹

- Ways of Working (formerly Technical Project Management)
- Power Skills (formerly Leadership)
- Business Acumen (formerly Strategic and Business Management)

Optionally, up to 25 of the 60 PDUs required for PMI-PMP® certification can be credited to the Giving Back category (Project Management Institute 2022, p. 4).

Working as a Top-Tier Management Consultant

McKinsey & Company distinguishes between mandatory and optional formal trainings. “Allrounders,” i.e., consultants who are not assigned to an industry or functional practice,²² complete seven mandatory trainings within their first two and a half years with the firm, up to and including the career level of Engagement Manager; in addition, they can choose from 12 optional trainings based on their individual strengths and weaknesses (see Exhibit 17). The mandatory trainings alone take 34 days, or nearly seven working weeks. Practice group affiliation typically occurs at the Engagement Manager career level.

The training program covers four different competency complexes:

- Analysis & Problem Solving
- Communication
- Team & Client Leadership
- Functional & Industry Expertise

Exhibit 18 shows which skills are primarily taught in the various compulsory

²¹ Once eight PDUs have been earned for each section, the remaining PDUs can be obtained in any area of Talent Triangle (PMI 2022, pp. 4–6).

²² Practice group affiliation typically occurs at the Engagement Manager career level.

Examining Different Pathways for Acquiring Project Management Skills

McKINSEY & COMPANY: OVERVIEW ON FORMAL TRAINING PROGRAMS FOR “ALLROUNDERS” UP TO THE ENGAGEMENT MANAGER CAREER LEVEL

Mandatory Trainings	New Hire Orientation (NHO)	EMBARK ¹	LEAD I ²	Engagement Management Basics (EMB)	LEAD II ³	Summer Academy (SumAc)	Functional Foundations
	• In-person • 5 days	• In-person • 5 days	• In-person • 10 Tage	• In-person • 5 days	• In-person • 5 days	• In-person • 4 days	• Online • Self-paced
Optional Trainings	Mini-MBA ⁴	7-Step Problem-Solving Workshop	Communication & Presentation Skills	Team Room Presence	Team Learning	Getting & Giving Feedback	Mentoring & Individual Coaching
	• In-person • 5 days	• In-person • 1 day	• In-person • Ca 1.5 days	Not specified	• In-person • As required	Not specified	• One on one • As required
	Digital & Analytics (DnA) Tech Week	Specific Trainings on (Functional) Topics	Hard-Skill Courses (e.g., PowerPoint, Excel)	Digital Learning Platforms (Various Topics)	Self-Guided Trainings ⁵		
	• On-/offline • Self-paced	• On-/offline • 5 days	Not specified	• Online • Self-paced	• On-/offline • 4 days per year		

¹ Former Basic Consulting Readiness (BCR)

² Former Initial Leadership Workshop (ILW)

³ Former Engagement Leadership Workshop (ELW)

⁴ For new consultants without an MBA or extensive business experience

⁵ Free choice (external) of training that makes sense for the job

Source: T. K. HAMANN based on McKinsey & Company (n.d., d. 2018; 2021b; 2024); Adams & Zanzi (2004); Greiner & Ennsfellner (2008); Bock (2015); Butcher (2015); Rogulenko (2016); Brena (2018); Anonymous (2019; 2022); Schmitt (2020); Nuffer (2021); Case Interview Hub (2023); and Assistant (2024)



Exhibit 17

McKINSEY & COMPANY: CORE LEARNING CONTENT FOR “ALLROUNDERS” UP TO THE ENGAGEMENT MANAGER CAREER LEVEL

<p>Analysis & Problem Solving</p> <ul style="list-style-type: none"> Problem-solving approach/methods Analysis frameworks/tools Creativity techniques Synthesizing and deriving recommendations 	<p>Communication</p> <ul style="list-style-type: none"> Storylining Designing compelling charts Delivering oral presentations
<p>Team & Client Leadership</p> <ul style="list-style-type: none"> Project planning and management Teamwork and interaction with other people, incl. interviewing Leadership role in the project Individual leadership profile Conducting negotiations Client/expectation management Developing/maintaining client relationships 	<p>Functional & Industry Expertise</p> <ul style="list-style-type: none"> Basic functional frameworks/tools Functional expertise and industry knowledge Project-specific preparations

Source: T. K. HAMANN



Exhibit 18

and optional training programs along these competency complexes.

Analogous to the above, the same applies to the other top-tier con-sultancies.

Proof of Performance/Exam

Academic Degree Programs in Project Management

Unfortunately, Colorado State University Global (CSU Global) did not provide any information about its system for demonstrating academic and practical achievement, specifically regarding the format and details of the exams in the Master in Project Management program, in response to an email sent on March 22 and 23, 2023. It is understood that CSU Global does not conduct proctored exams. Instead, as evidenced by posts on relevant Internet forums (e.g., GradReports n.d.; Yelp n.d.; OnlineU 2023), at CSU Global course credit is earned in only a few courses through tests and typically six to seven seminar papers per course (GradReports n.d, see posts by “Ethan McCord” on January 17, 2022, “Mommabear” on April 15, 2022, “IT Student” on April 26, 2022, “Michael” on August 15, 2022, “Anna”²³ on September 29, 2022, “PJ” on January 22, 2023, and “JAALLEN85”²³ on January 24, 2023;

Yelp n.d., see posts by “Leanna P.” on July 02, 2017). CSU Global’s Master of Project Management is aligned with the Project Management Institute and prepares students to take the Project Management Professional® exam; graduates of GAC²⁴-accredited programs such as the Master in Project Management can count the coursework as a significant portion of the required practical experience when applying for PMI certification (CSU Global n.d. b).

Capella University follows an approach called competency-based education; the idea is to acquire professional skills for use in a practical, real-world work environment, i.e., directly application-oriented (Capella University n.d. l). This means that in the Master of Business Administration in Project Management program, Capella University does not rely on traditional exams as proof of skill acquisition (Anonymous 2025), but rather on application-based and, where appropriate, project-oriented tasks in which knowledge is measured and evaluated through practical application, such as creating a business case or making recommendations based on a company’s quarterly reports (Capella University n.d. l).

“Competency-based education involves defining what success looks like in a particular field and then developing the most direct educational path to that success. To develop an academic program,

²³ Degree: Project Management (Graduate)

²⁴ Project Management Institute’s Global Accreditation Center for Project Management Education Programs

Capella's scholar-practitioner faculty determine the knowledge and professional standards and guidelines for curriculum in their discipline, while employers in the sectors Capella serves advise on what is expected from their best employees. Capella uses these insights to focus its academic programs on specific, measurable expectations called learning outcomes. The university outcomes are aligned to the program outcomes which are aligned to course competencies and scoring guide criteria [...]." (Capella University n.d. m).

Capella University does not offer the PMI-PMP^{®25} exam, but they do partner with the Project Management Institute so the MBA in Project Management is aligned with the relevant content of the PMI-PMP[®] (Anonymous 2025).

Project Management Certifications

The PMI-PMP[®] certification is awarded based on an examination. The exam is a written online exam consisting of 180 questions²⁶ covering the three areas of People (42%), Processes (50%) and Business Environment (8%), which must be answered in a total of 230 minutes, i.e., in just under four hours (PMI 2020b); this means that on average one minute and 17 seconds is available to answer a question.

The question style is currently a combination of multiple-choice questions (with one valid answer), multiple-response questions (with several correct answers), questions that match terms to categories (using drag and drop), hot-area questions,²⁷ and questions that ask candidates to fill in gaps in text passages or tables (Project Management Institute n.d. l; n.d. m). Exhibits 19 and 20 show some randomly selected exam questions with the correct answers.

²⁶ Of these, 175 were marked and—for testing purposes—5 were unmarked pre-test questions; “approximately half of the exam covers plan-driven approaches to project management, while the other half reflects agile or hybrid approaches” (Project Management Institute n.d. l).

²⁷ The idea is to click on the area of a digital graph that corresponds to certain data points in or statements about the graph (e.g., largest increase).

Examining Different Pathways for Acquiring Project Management Skills

PMI-PMP® CERTIFICATION: SAMPLE EXAM QUESTIONS (1/2)

Question 1

An element of the project scope statement is:

- A. Acceptance criteria
- B. A stakeholder list
- C. A summary budget
- D. High-level risks

Question 2

Which document describes the necessary information to determine if a project is worth the required investment?

- A. Cost baseline
- B. Service level agreement
- C. Memorandum of understanding
- D. Business case

Question 3

Which input to the Plan Risk Management process provides information on high-level risks?

- A. Project charter
- B. Enterprise environmental factors
- C. Stakeholder register
- D. Organizational process assets

Question 4

Which item is an example of personnel assessment?

- A. Resource calendar
- B. Tight matrix
- C. Team-building activity
- D. Focus group

Source: Certification-Questions (n.d.)



Exhibit 19

PMI-PMP® CERTIFICATION: SAMPLE EXAM QUESTIONS (2/2)

Question 5

A project requires the procurement of a large amount of equipment that needs to be on-site before any other activity can begin. The procurement department has a lengthy approval process. What should the project manager do?

- A. Contact the vendor that supplied similar equipment for a previous project
- B. Use the existing equipment and replace it later with the new equipment
- C. Ask the project sponsor to expedite the vendor selection process
- D. Work with the procurement team to find alternative options

Question 6

A project schedule risk has turned into an issue. The project manager foresees delays in project execution. What should the project manager do to resolve the issue?

- A. Escalate the issue to senior leadership for resolution
- B. Work with relevant stakeholders to determine possible solutions
- C. Update the schedule baseline to the new project timeline
- D. Update the risk management plan and send it to the project team

Source: ExamTopics (2022, post by "longge" on October 13); 2023, post by "Kayyy" on July 07)



Exhibit 20

Working as a Top-Tier Management Consultant




In the training programs of top management consultancies, learning progress is typically not measured by formal performance assessments such as exams/tests, essays, graded role-plays, etc. Rather, the expectation is that the skills learned can be successfully applied in practice and result in good performance. Each consultant's individual performance is evaluated every three to six months through a formal project evaluation (Rusche 2021), which at McKinsey & Company is called an Engagement Performance Review (Hattori 2016, p. 19). This project review is primarily a tool for direct feedback in the project, but it is also used by the relevant HR committees alongside other inputs (mainly interviews) in promotion and ranking discussions. It is therefore used to assess a consultant's career progress and to make decisions about possible promotion, to identify strengths and weaknesses (including recommendations for targeted development) in an evidence-based manner, and to determine salary adjustments and, if applicable, the amount of the bonus (PrepLounge n.d., posts by "Ken," "Robert" and "Henning" on October 27, 2020, and "Ian" on October 29, 2020). As shown in Exhibit 21, project managers are typically evaluated in three main categories in such a project evaluation (e.g., My Consulting Offer 2022)²⁸:

- Analytical/problem-solving skills
- Client-oriented skills
- Organizational and management strengths

For each sub-criterion, the project manager being evaluated receives a rating on a multi-level scale (e.g., "excellent/outstanding performance," "strong performance," "solid performance," "below expectations/serious problems"). If a sub-criterion cannot be adequately rated, the supervisor chooses the neutral category "not relevant/not sufficiently observable." Ideally, a short text is provided for each criterion describing the performance expected to achieve that rating level. This is to ensure that the ratings provided by different people are based on the same standards and benchmarks, thus making the ratings for different consultants comparable.

²⁸ At the Senior Project Manager level and above, an additional key category is added in terms of entrepreneurial skills to develop the consultancy and generate business (including winning new clients).

EVALUATION CRITERIA FOR PROJECT MANAGERS AT TOP-TIER CONSULTING FIRMS

 Analytical/Problem-Solving Skills	 Client-Oriented Qualifications	 Organizational and Management Strength
<ul style="list-style-type: none"> • Analytical Excellence <ul style="list-style-type: none"> – Identifying and structuring problems and developing appropriate working hypotheses – Guiding the creation of error-free analyses – Dealing with changing issues • Solution Generation/Derivation <ul style="list-style-type: none"> – Understanding the big picture – Synthesizing the analysis results – Deducing informed, appropriate/realistic recommendations • Expertise <ul style="list-style-type: none"> – Knowing and being able to use appropriate (standard) tools – Demonstrating specialized knowledge/skills – Becoming or being an expert on a particular topic – Contributing to knowledge building (beyond the project) <p style="font-size: small; margin-top: 10px;"> * In terms of available time and expertise/skills to ensure the best possible contributions ** For example, mediating between clients, supervisors, and the work team *** For instance, taking responsibility and showing initiative </p>	<ul style="list-style-type: none"> • Client Relationship <ul style="list-style-type: none"> – Understanding and empathizing with clients – Building trust with clients – Building strong and collaborative client relationships – Demonstrating a high level of quality in relationship management and design – Contributing to client development • Successful Communication <ul style="list-style-type: none"> – Applying a highly effective communication strategy – Conveying relevant insights by building and organizing compelling arguments in a logical flow – Creating appropriate written documents (e.g., presentations, reports, memos/emails) – Possessing excellent oral communication skills (e.g., speaking, contributing to/leading meetings) 	<ul style="list-style-type: none"> • (Internal) Interoperability <ul style="list-style-type: none"> – Planning and controlling the project and processes effectively and efficiently (including time management) – Cultivating an inspirational leadership style – Promoting internal communication – Involving all team members optimally* – Encouraging and channeling the creativity of the team – Balancing interests** and helping to resolve conflicts – Making a personal contribution*** • Professional and Personal Development <ul style="list-style-type: none"> – Often offering helpful/constructive criticism – Accepting and responding to feedback from others – Coaching and assisting others in their development

Source: Rusche (2021); T. K. HAMANN



Exhibit 21

Major Types of Project Management Education: Discussion of Qualities

Exhibit 22 summarizes the main features of the three forms of project management education and training considered here.

Key Formal Hire/Admission Requirements





The skills typically developed at university, in general and regardless of the subject studied, are very helpful for project management and certainly provide a good foundation for further relevant training and

education. For example, Hurcum (2021) lists the following five skill areas: communication, budgeting and money management, time management, critical thinking and problem solving, and dealing with and accepting constructive criticism.

In terms of practical experience, the Project Management Certification with a minimum of 36 months places the highest demands on the experience already available at the beginning of the training or education. However, it is critical to note that, as mentioned in another blog post, the verification of practical project management experience seems to be handled quite laxly. No further proof of practical project work is required for recertification. Practical experience is not essential to

Examining Different Pathways for Acquiring Project Management Skills

BASIC TYPES OF PROJECT MANAGEMENT EDUCATION: COMPARISON BY KEY EVALUATION CRITERIA

	Working in Top-Tier Management Consulting	Academic Studies in Project Management (Master's Degree)	Project Management Certification (PMI-PMP®)
 Key Formal Hire/Admission Requirements	<ul style="list-style-type: none"> Advanced graduate degree (e.g., MBA, PhD) with outstanding grades 	<ul style="list-style-type: none"> Bachelor's degree 	<ul style="list-style-type: none"> High school or secondary school diploma*
 Time Spent Learning/ in Training	<ul style="list-style-type: none"> Ca. 1,800 hours, thereof 300 hours formal training and 1,500 hours on-the-job training 	<ul style="list-style-type: none"> 1,728 hours of studying, consisting of 576 hours of contact time and 1,152 hours of individual preparation/follow-up time 	<ul style="list-style-type: none"> Formal training: 35 hours Working through exam questions: 70 hours
 Main Learning Content/ Curriculum	<ul style="list-style-type: none"> General consulting and problem-solving skills, including project management skills Leadership competencies Functional/industry expertise 	<ul style="list-style-type: none"> Project management methods and administration Organizational theory Operations management Business analytics Functional/industry specialization 	<ul style="list-style-type: none"> Project management principles Project control along project performance domains Leadership/personal interaction and communication Continuous learning & development Models, methods, and artifacts
 Proof of Performance	<ul style="list-style-type: none"> Regular individual performance reviews 	<ul style="list-style-type: none"> Mainly seminar papers and application-based assignments/tasks 	<ul style="list-style-type: none"> Written online exam

* Or an associate's degree or completed vocational training and 60 months of project management experience within the last eight years; or a bachelor's degree and 36 months of project management experience within the last eight years

Source: T. K. HAMANN



Exhibit 22

join a top-tier consulting firm, but training and education are closely intertwined with day-to-day project work. The Project Management Certificate, as already mentioned, requires a certain amount of relevant work experience, while the top-tier consulting firms require this experience to be acquired experience through the program. Only the academic project management degree programs typically do not require any work experience or require only limited practical application of course content in the capstone course and some assignments. Even to obtain the PMI-PMP® certificate through the project management degree program at Colorado State University Global (n.d. b), the practical work requirements are greatly reduced, with a significant portion of the

program itself being credited by the Project Management Institute as practical experience.

Top-tier consulting firms have the highest formal educational requirements, requiring an excellent advanced degree (e.g., MBA, PhD) in addition to consistently demonstrating superior analytical skills in multiple rounds of interviews. Academic project management degree programs typically require at least a bachelor's or master's degree with an overall grade of "good." To be eligible to take the PMI-PMP® certification exam, you must have at least a bachelor's degree with an overall grade of "passing" and at least 36 months/3 years of project leadership and management experience within the last eight years, or a high

school diploma or completed vocational training with at least 60 months/5 years of project leadership and management experience within the last eight years.

All in all, the approach of the top-management consultancies is the most sensible in terms of admission requirements. The classification and reflection as well as the application of theoretical knowledge based on personal experience in project practice are very important; after all, this is how understanding is deepened, meaningful behavior is practiced, and one's own performance is subjected to criticism by colleagues and superiors. To a certain extent, this is possible in the context of a retrospective view of past experiences, but it is not possible to practice newly learned behaviors and methods. In this respect, practical work during or after project management training is much more important than before. When designing education and training programs in project management, it makes sense to assume that applicants have good relevant skills and to require evidence of this—whether this necessarily requires a university degree is an open question. Among other things, this can be used to draw conclusions about basic aptitude for project management. Practical experience should accompany the teaching of theoretical knowledge but is not a requirement for an excellent training and further education concept. In addition, interviews at top consultancies are much more helpful than academic degrees and grades in determining the extent to which the candidate already meets the specific requirements of a management

consultant or project manager or has the potential to develop into such a role.

Time Spent Learning/In Training

The CSU Global Master in Project Management program is designed to be completed within 1,728 hours. This is approximately 20 percent more than the maximum time frame for a two-year vocational training program. However, the course of study is largely limited to the theoretical transfer of knowledge. It is imperative to incorporate practical experience in the field of application of professional work, as it is a necessary condition for sustainable professional development (Gruber 1999; Dreyfus & Dreyfus 2005; Billett, Harteis & Gruber 2018; Ericsson 2018; Feltovich, Prietula & Ericsson 2018; Harteis, Billett & Gruber 2020 as cited in in Goller 2021). Active engagement with practice enables learners to acquire, extend, qualitatively transform and assess the adequacy of professionally relevant knowledge structures (Goller 2021, p. 5 with reference to Gerholz & Goller 2021 and Goller 2021, ch. 3.2). At the top-tier consultancies, the practical component (on-the-job training) lasts an average of 1,500 hours, two to three times longer than vocational training. The focus is clearly on applying skills in day-to-day project work, which accounts for about 95 percent of total working hours (6,000 hours) compared to about 5 percent of training hours, which is even higher than in an apprenticeship.

In contrast, the 35 hours required to register for the PMI-PMP® exam seems extremely low. Furthermore, the fact that 70 hours are estimated for working through the exam catalog illustrates that the focus is on preparing for the exam rather than applying the knowledge in practice. As already mentioned, the required practical experience gained in the past does not allow for the application and practice of theoretical content, but only for a certain amount of reflection after the fact. A serious project management education or training program should include an extensive classroom component as well as the opportunity to apply and practice what is learned in the classroom—ideally accompanied by a mentor or coach who can observe and provide important feedback.

Vocational training lasts two to three-and-a-half years in Germany (Federal Employment Agency Germany n.d.; Secretariat of the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany n.d.). The dual training consists of three to four days at the company and up to two days at the vocational school. With 42 working weeks (Lexware.de n.d.) and assuming the shortest training period of two years, this results in a total of 84 working weeks. Assuming an eight-hour workday, this amounts to 2,016 to 2,688 hours of company practice. It should be noted that this remaining working time does not consist entirely of learning experiences. Therefore, it is estimated that approximately 25 percent of working time is dedicated to acquiring new knowledge or skills, amounting to 504 to 672 learning hours within the company.

A vocational school day is defined as a working day if it includes more than five teaching units of at least 45 minutes each (Chamber of Commerce and Industry of Berlin n.d.; JArbSchG, §9). Assuming six hours of vocational school per day, this corresponds to 4.5 hours. This means that, for a training program, between 378 and 756 hours of theoretical training are added to the practical work at the company. For vocational training, it is estimated that a total of 882 (=504+378) to 1,428 (=672+756) hours must be invested, depending on the specific training program and the duration of the apprenticeship. This means that the vocational school should take up about 12 to 27 percent of the total working time.

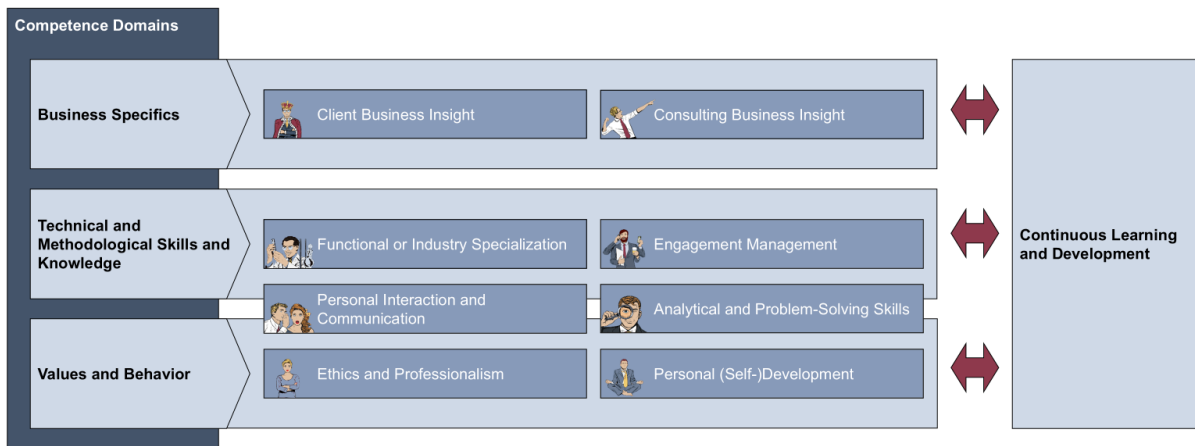
In conclusion, among Project Management Training Programs, the training and development period at top-tier consultancies is among the longest and has the highest proportion of on-the-job training coupled with regular feedback.

Main Learning Content/ Curriculum

To evaluate the content of project management training and professional development programs, it is necessary to establish a framework that delineates the ideal skills to be imparted. To this end, the three domains of competence and eight subject areas delineated by the International Council of Management Consulting Institutes (2014) have been employed (see Exhibit 23). The foundation is established by the “Values and Behavior” category, en-

Examining Different Pathways for Acquiring Project Management Skills

TARGET SKILLS PROFILE FRAMEWORK FOR PROJECT MANAGEMENT



* Or an associate's degree or completed vocational training and 60 months of project management experience within the last eight years; or a bachelor's degree and 36 months of project management experience within the last eight years

Source: T. K. HAMANN based on International Council of Management Consulting Institutes (2014)



Exhibit 23

compassing the sub-categories “Ethics and Professionalism” and “Personal (Self-) Development.” For project-related responsibilities, “Technical and Methodological Skills and Knowledge” are essential, including a “Functional or Industry Specialization” and competencies in “Project Management.” “Personal Interaction and Communication” is based on certain values (e.g., a view of humanity), while certain behaviors and the associated methods (e.g., conversation/questioning techniques) are used for them. “Analytical and Problem-Solving Skills” are also based on values (e.g., avoiding manipulation of data) and require certain behaviors (e.g., going through a problem-solving process) that involve the use of various methods (e.g., statistical procedures) and tools (e.g., spreadsheet soft-

ware). Therefore, these two last-mentioned subject areas are shown in Exhibit 23 across all fields of expertise. Successful project managers must understand the relevant “Business Specifics” of the client company and the consultancy for which they work. Within the competence field of “Business Specifics,” the topic area of “Consulting Business Insight” is more relevant for management consultants than for project managers per se.

Colorado State University (CSU Global) offers a Master in Project Management program that includes the domain of “Functional or Industry Specialization.” This is addressed through the required courses “Effective Organizations: Theory and Practice” and “Operations Man-

agement,” as well as through the specialization courses. The required courses “Project Management” and “Project Metrics, Monitoring, and Control,” along with the elective courses “Project Management Office (PMO)” and “Agile Project Management,” primarily cover the domain of “Project Management.” The elective course in “Business Analysis” aims to provide students with a comprehensive understanding of the businesses under consideration. The “Capstone” course, which is mandatory, focuses on the application of project management skills and, as such, on linking the subject areas of “Engagement Management” and the domain of “Continuous Learning and Development.” The latter subject area is about deepening the knowledge acquired.

The Master in Project Management program is primarily focused on the domain of “Technical and Methodological Skills and Knowledge”. Additionally, the competence fields of “Continuous Learning and Development” and “Business Specifics” are covered, at least through an elective course. For the remaining domains and subject areas, there are no courses with a corresponding focus. They are touched on only marginally in the other courses. The large number of seminar papers to be written also serves to practice writing (scientific) texts and, thus, to a certain extent, written communication.

The training for certification as a PMI-PMP® focuses primarily on the subject area of “Engagement Management.” Select content on team management and leadership is assigned to the topic of “Personal Interaction

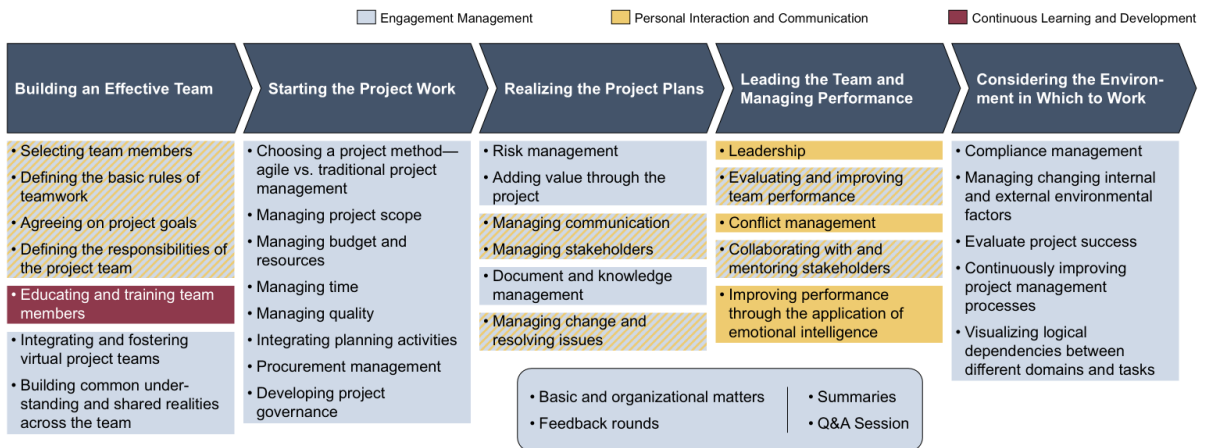
and Communication.” The topic of “Training and Development of Team Members” also intersects with “Continuous Learning and Development” (see Exhibit 24; shaded areas indicate topics that concern aspects of or interfaces between two different subject areas). The other domains and subject areas from Exhibit 23 are not addressed.

A thorough examination of the contents of the PMBOK® Guide (seventh edition; Project Management Institute 2021c) reveals no substantial alterations to the content coverage. The PMBOK® Guide provides generic descriptions and definitions of numerous aspects and concepts of project management within the aforementioned topics, functioning as a reference book. However, it does not offer specific application advice. Preparing and visualizing data and information for communication purposes in the form of diagrams serves as an example for illustration. The contents contained in the PMBOK® Guide (Project Management Institute 2021c) are a list in which 23 different diagram types from A (Affinity Diagram) to V (Velocity Chart) are briefly described in a very general way, e.g.,

- **“Scatter diagram.** This graph shows the relationship between two variables.“ (p. 189)
- **“Use case.** This artifact describes and explores how a user interacts with a system to achieve a specific goal” (p. 190).

Examining Different Pathways for Acquiring Project Management Skills

PMI-PMP® PREPARATION COURSE: CONTENT



Source: T. K. HAMANN based on Fuchs & Consorten Unternehmensberatung (n.d.)



Exhibit 24

For more information on the use case, please refer to p. 195 of the PMBOK® Guide, where it is indicated that it can be used in the “Planning” and “Delivery” service domains. However, it should be noted that the PMBOK® Guide does not offer additional insights regarding this use case.

Of the 23 types of diagrams, only three are shown as generic examples in the PMBOK® Guide. The PMBOK® Guide is too limited in scope to serve as a suitable textbook for project management.

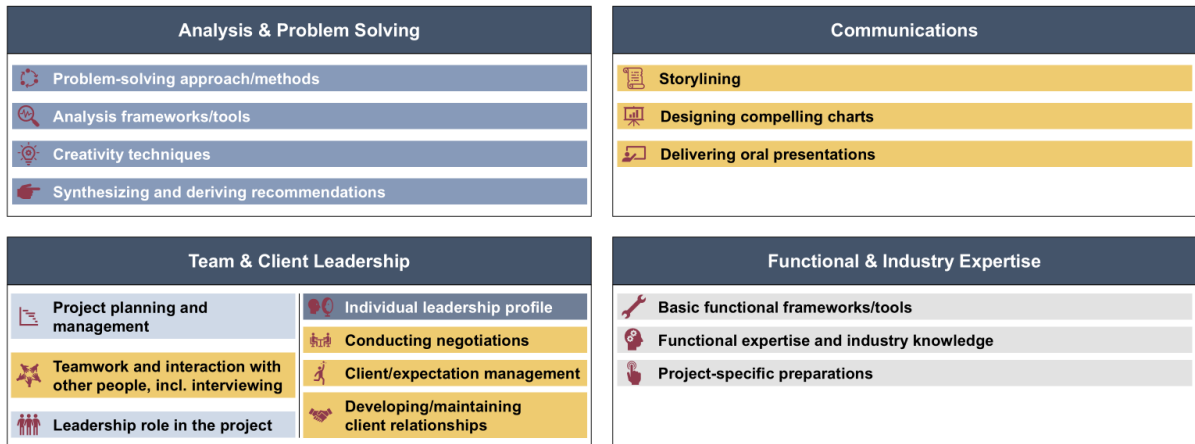
As illustrated in Exhibit 25, the core learning content of mandatory trainings at top-tier consultancies encompasses five subject areas shown in the framework underlying Exhibit 23. By working on consulting projects, one gains “Client Business In-

sight.” Since the assignments and industries can change from project to project, and a new project is due approximately every three months (McKinsey & Company n.d. g), one can gain insight into several different businesses, especially at the beginning of one’s consulting career. At the lower career stages, one gains a basic understanding of the consulting business, i.e., “Consulting Business Insight.” However, at these levels you will generally only be involved in the preparation of proposal documents, and internal management tasks are the responsibility of senior colleagues, especially partners. Therefore, an understanding of the business of consulting only becomes relevant as you gain more experience. Regarding “Ethics and Professionalism,” once a year the entire

Examining Different Pathways for Acquiring Project Management Skills

McKINSEY & COMPANY: CORE LEARNING CONTENT FOR “ALLROUNDERS” UP TO THE ENGAGEMENT MANAGER CAREER LEVEL

■ Analytical and Problem-Solving Skills
 ■ Personal Interaction and Communication
 ■ Engagement Management
 ■ Functional or Industry Specialization
 ■ Personal (Self-)Development



Source: T. K. HAMANN



Exhibit 25

McKinsey & Company spends a day cultivating the company’s values (Lietke 2018; McKinsey & Company 2022). In addition, more experienced colleagues teach them onboarding and continuously on the job. McKinsey & Company (2022, p. 36) also promotes a culture of development and continuous learning, which is congruent with the domain of “Continuous Learning and Development;” at McKinsey & Company, continuous learning means:

“Every role at McKinsey has a core learning journey, built around our skills taxonomy, that is designed to balance leadership skills, capabilities for client service, technology acumen, and risk management awareness. Core programming may be:

- *universal, such as our One Firm Onboarding curriculum for new colleagues*
- *hybrid, such as our Business Essentials learning module designed for client-facing colleagues with diverse educational and professional backgrounds*
- *self-directed, for example, a modular Digital and Analytics Tech Week created to empower colleagues from any background to level up in those skills*
- *customizable, such as content tailored for specific regions, interest or practice areas, role transitions, or affinity groups*

We have created more than 2,500 learning offerings and provide access to tens of thousands more from external content

providers. Colleagues have access to elective and on-demand learning, as well as certifications and credentialing, to broaden skills, deepen expertise, and personalize their own development. In 2021, we introduced a new learner experience platform, providing a one-stop shop that provides colleagues with easy access to all of our learning content.”

In addition, on-the-job feedback is provided on a regular basis. This ensures continuous learning and development. The training and further education provided by the top-tier management consulting firms covers all pertinent competency domains and their subject matter areas.

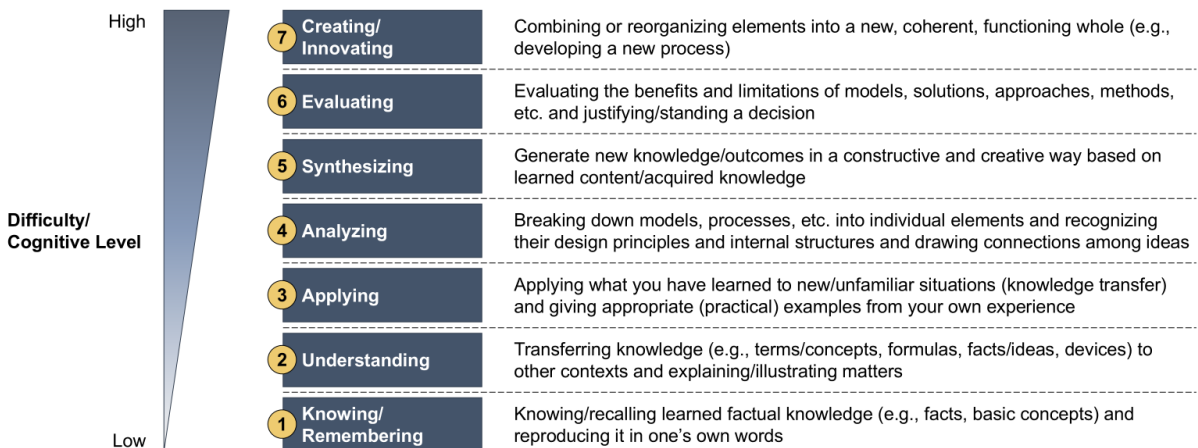
Project management training programs vary in their focus. CSU Global emphasizes technical skills, top consulting firms prioritize continuous learning and hands-on experience, and PMI-PMP® certification centers on engagement management. The project management education at top-tier consultancies is the only program that covers all competency domains comprehensively. A combination of education, practical experience, and ongoing development is essential for well-rounded project management expertise and hence must be addressed.

Proof of Performance/Exams

The level of cognitive performance that should be mastered at the end of a course or program is usually described and classified using taxonomy levels (University of Zurich n.d.). An example of such taxonomy levels is shown in Exhibit 26. At the lower levels of this system, the focus is on imparting lexical knowledge, while at the upper levels, knowledge is related and synthesized, evaluated and selected for its usefulness (Evaluating), and adapted for new application contexts or used to gain entirely new insights (Creating/Innovating) (Kramp 2020). The upper levels of the taxonomy thus address the formation of competencies, which Weinert (2001, pp. 27–28 as cited in Klieme et al. 2023) defines as the cognitive abilities and skills that individuals possess or can learn to possess to solve certain problems, as well as the associated motivational, volitional, and social readiness and abilities to use the problem solutions successfully and responsibly in variable situations. It is obvious that competencies in this sense are required to solve business problems and manage projects successfully. Examinations should provide information about the achievement of learning objectives at the different levels of the taxonomy by allowing examinees to demonstrate their abilities.

Examining Different Pathways for Acquiring Project Management Skills

TAXONOMY LEVELS



Source: T. K. HAMANN based on Schweizer Berufsverband der Pflegefachfrauen und Pflegefachmänner SBK, Sektion Zürich/Glarus/Schaffhausen (n.d.); Bloom (1956); and Krathwohl, Bloom & Masia (1978) and Leibniz University Hannover (n.d.) as cited in University of Innsbruck (n.d.)



Exhibit 26

At top-tier consultancies, training is aligned with the requirements of the role typically taken on a project at the current or next career level, or with individual development needs. As a result, consultants are required to apply what they have learned to specific project situations very quickly. Their performance is evaluated on a regular basis. This corresponds to Taxonomy Level 3 (Applying, see Exhibit 26). In addition, the following skills are typically evaluated at the (senior) consultant level, i.e., before the project manager level, within the main category of analysis/problem solving skills:

- Structuring problems and breaking them down into individual aspects (Taxonomy Level 4: Analyzing)

- Performing complex and sophisticated (data) analysis (Taxonomy Level 4: Analyzing)
- Interpreting and evaluating the results of the analysis and deriving recommendations for action (Taxonomy Level 5: Synthesizing)
- Initiating and driving change within the client organization (Taxonomy Levels 5 and 6: Synthesizing and Evaluating)
- Extending one's knowledge by integrating and generating new insights (Taxonomy Levels 5 and 6: Synthesizing and Evaluating)

Examining Different Pathways for Acquiring Project Management Skills

For project managers, the following skills are also included in the assessment:

- Adjusting the approach or focus of the solution
(Taxonomy Levels 6 and 7: Evaluating and Creating/Innovating)
- Developing creative and innovative recommendations while considering the client's ability to implement them
(Taxonomy Levels 6 and 7: Evaluating and Creating/Innovating)
- Developing new and creative conceptual frameworks and analytical approaches
(Taxonomy Level 7: Creating/Innovating)
- Contributing to the development of new knowledge and methodologies
(Taxonomy Level 7: Creating/Innovating)

The Master in Project Management program at CSU Global emphasizes the writing of seminar papers to demonstrate mastery of the material covered in each course. It is not possible to assign a specific taxonomy level based on the type of assessment alone, as the content requirements are important. Unfortunately, no information is available on the specific tasks for the seminar papers to be written in the program examined here as an example. However, the preparation of a disposition for a seminar paper as a planning process can already be assigned to the Taxonomy Level 7 (Creating/Innovating) (Gröblichhoff 2015, p. 5 with reference to Anderson & Krathwohl 2001 and Bloom 1956). A seminar paper is optimally successful if it leads the reader to new insights in clear and unambiguously comprehensible steps (University of Karlsruhe 2007, p. 3); according to Exhibit 26,

the generation of new insights is at least at Taxonomy Level 5 (Synthesizing). Seminar papers of the basic type "Problem Overview" (compilation) usually require the development of evaluation or selection criteria regarding the applicability of the respective theories to specific problems (University of Karlsruhe 2007, p. 5) and thus include an evaluation (Taxonomy Level 6 in Exhibit 26). The basic type "Exemplary Study" can be based on the transfer of a theory or methodology to an object, a question or an exemplary target group that has not yet been considered or the exemplary exploration (of something new) of a topic that is still largely unknown (University of Karlsruhe 2007, p. 6); this corresponds to the requirements of the spectrum between Taxonomy Levels 3 (Applying) and 5 (Synthesizing) according to Exhibit 2. The Capstone course, a compulsory part of the Master in Project Management program at CSU Global, involves applying or transferring the learned content to a specific project of the student's own choice (CSU Global 2023), which corresponds to Taxonomy Level 3 (Applying). Overall, it can therefore be assumed that the assessments in the degree program under review typically correspond to at least Taxonomy Level 3 (Applying).

When taking a test to obtain a project management certificate, such as the widely recognized PMI-PMP®, the restrictions in terms of response time and question format prevent the application of knowledge to a (fictitious) new practical situation, such as developing a meaningful project schedule based on the objectives to be achieved and

the available capacities. This is akin to having to pass only the theory part of a driving test, while neglecting the practical driving component. For Question 1 in Exhibit 19, it is only necessary to know the elements of the Project Scope Statement and to identify the acceptance criteria (Answer A) as such. The Project Scope Statement's elements and the acceptance criteria for meaningful acceptance criteria (Taxonomy Level 2: Understanding) are not relevant for this question. Neither is the development of acceptance criteria specifically tailored to a (fictitious) project, or the evaluation (fictitious) project results based on certain acceptance criteria (Taxonomy Level 3: Applying). The higher Taxonomy Levels 4 to 7 (Analyzing, Synthesizing, Evaluating, and Creating/Innovating) are not considered when classifying Question 1. This means that for Question 1, the certificate candidate must recognize and reproduce learned knowledge (Taxonomy Level 1: Knowing/Remembering) and perform the simplest cognitive task in the present taxonomy system. The comments on Question 1 apply analogously to Questions 2 to 4, which are reproduced as examples in Exhibit 19.

Questions 5 and 6 (see Exhibit 20) appear to be application questions (Taxonomy Level 3) at first glance. However, Question 5, for example, is not about showing how one would work with the procurement team or what suggestions one could make to the procurement team. Rather, it is only about naming a learned procedural step. In essence, Question 5 focuses on reproducing learned knowledge (Taxonomy Level 1) or,

at best, a certain understanding of the situation and the appropriate behavior (Taxonomy Level 2). This is particularly evident in Question 6, where the correct answer is to simply delegate the problem that is likely to cause project delays back to management for resolution. This approach contradicts the principles of the PIM-PMP® certification, which advocates for a more holistic approach to problem-solving. The PMP-PMP® certification focuses on a mechanistic understanding of project management, as outlined in the PMBOK® Guide. While the PMBOK® Guide provides a foundational understanding of various project management aspects, it does not offer specific guidance on how to achieve desired results, and it covers some trivial details. Consequently, the exam focuses on lower-level cognitive skills, predominantly at Taxonomy Level 1 (Knowing/Remembering) and to a lesser extent at Taxonomy Level 2 Understanding). Given that the catalog of exam questions can be memorized in advance, all questions in the PMI-PMP® exam are at the lowest Taxonomy Level 1.

Certificates of achievement that merely test memorized facts and only partially test comprehension of the content cannot provide a positive prognosis for the successful application of a method (which may not be explained in detail in the context of the training), for the selection of a suitable method based on an assessment, or for the independent development of a new approach that meets specific requirements. This is especially true since the corresponding skills are not systematically taught as part of the training program before the exam.

Examining Different Pathways for Acquiring Project Management Skills

For the top-tier management consultancies, the evaluation of learning success is always based on the ultimate question of how well employees perform in day-to-day projects and how well they generate new consulting knowledge. The latter is, after all, a key business driver for consulting service providers. In this context, cognitive requirements are often placed at the highest level of the taxonomy.

If a top-level consultant receives a poor or very poor project review, he or she is immediately placed on a watch list. If the consultant fails on the next project, he or she is informed that there will be no promotion to the next career level and is encouraged to leave the consulting firm. Based on this strict up-or-out policy (e.g., Berndt 2013), outsiders who have no insight into internal performance evaluations can assume that consultants who have worked for a top consulting firm for a long time and have even been promoted one or more times have met high performance standards in their projects. Otherwise, they would not have stayed with the firm for so long, let alone been promoted to the next career level. Against this backdrop, promotion to project manager (called Engagement Manager at McKinsey & Company) and subsequent work in that role is often seen as a seal of quality that can be verified externally through a job reference.

When providers of project management education and training programs select one or more assessments, they should consider several key aspects during the design and development process. These assess-

ments should be process-oriented in the sense of project administration, as typically performed by a project management office (PMO), and should also comprehensively cover the development of solutions, as is relevant for well-managed projects. Ultimately, project management has a supporting function for the content work. Most of the tasks should be at Taxonomy Level 3 (Applying) or higher in terms of difficulty, and the more realistic the exam tasks are, the better. For example, case studies with a very specifically described realistic problem are useful.

Conclusions

The high failure rate of projects across industries underscores the urgent need for more effective training and education in project management. Therefore, we conducted an analysis of three primary pathways for acquiring project management competencies. This has revealed significant issues in terms of having enough people with the skills required for successful project delivery.

These are the different types of project management education that were examined:

- (1) **Academic Degree Programs** These programs, such as those offered by universities in the U.S. like Capella University, Colorado State University Global (CSU Global), and University of Phoenix, and elsewhere, provide structured theoretical knowledge but often lack sufficient practical application. While students acquire fundamental skills, the lack of practical experience hinders their ability to effectively manage real-world projects.
- (2) **Project Management Certifications** The relevant certifications such as the Project Management Professional (PMP)[®] credential from the Project Management Institute (PMI) are widely recognized in the industry. However, these certifications' emphasis on theoretical knowledge and standardized exams that prioritize memorization on the lowest cognitive difficulty level over practical application may limit their effectiveness in preparing individuals for real-world project challenges.

- (3) **Training through Top-Tier Management Consulting Firms** Leading consultancies such as McKinsey & Company, the Boston Consulting Group (BCG), and Bain & Company offer comprehensive training programs that integrate theoretical learning with practical experience. Their systematic approach to problem-solving, client interaction, and continuous feedback has been recognized as one of the most effective in developing project management skills. However, the number of (former) consultants who have participated in these exceptional training programs remains insufficient to meet the growing demand for highly skilled project managers outside of consulting firms.

A key finding of the study is that the most effective project management training involves a combination of theoretical knowledge and real-world application. Top-tier consulting firms offer the most rigorous training programs, covering all critical competency areas, including problem-solving, leadership, stakeholder management, and effective communication. The company provides structured and detailed feedback on a regular basis. This ensures that individuals quickly strengthen their strengths and improve their weaknesses, and it makes their tenure in consulting a strong indicator of competence in project management. Consultancies endeavor to retain their top performers, a practice which has the effect of limiting the number of capable project managers available in the labor market.

Conversely, certifications such as PMI-PMP® have the least stringent entry requirements and learning duration, making them accessible but insufficient for mastering project management complexities. The assessment format of these certifications focuses on lower-level cognitive skills (e.g., memorization, rather than higher-level analytical and problem-solving abilities). Due to the minimal requirements for obtaining such a certification, these are now often offered by unverified providers via email.

In summary, there is an imperative for project management education outside of top-tier consulting to transition towards an integration of theory with application-based learning, continuous development, and critical thinking. This transformation is essential to effectively prepare professionals to navigate the complexities of modern projects. Organizations that aim to enhance project success rates should prioritize suitable formal education, experience-based learning, and mentorship in conjunction with each other.

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T. K. Hamann Gesellschaft mbH
Frei-Otto-Straße 22
DE-80979 Munich

T: +49 89 99947511

Email: info@tkhamann.training

Internet: www.tkhamann.training
www.tkhamann.com