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A Comparison between E-learning Resources currently used in Project Management Online Training

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Abstract

E-learning has become popular among learners of all ages and different domains, while project management is one of the many practices that have been impacted by the 21st-century online digital environment. The goal of this paper is to explore and compare current e-learning resources that help online train and continuously educate IT project managers in software developing industries. As to the methodology, a qualitative method will be used for applied research: inductive approach - inductive reasoning. Each identified resource will be provided with a narrative description based on process-oriented interrogations. In the end, a comparison will be made between the existing online platforms offering project management related courses, in order to help conclude which e-learning materials are best to be used by project managers nowadays, taking into consideration their educational needs.

Keywords: e-learning platforms, online courses, education, project management training

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Introduction

Learners of all ages from different domains and locations all around the world can count on the constant evolution of e-learning and online resources in order to continuously learn. In the Project Management (PM) domain, as in many other domains impacted by the 21st-century online digital environment, numerous sources of online information are available on the internet - but not all of them are proper to be considered for studying and/or consulting.

Through this research paper, the author aims to provide both a detailed picture and a general overview of existing online materials and resources which are appropriate for project management training and continuous education. The research objectives are: to identify, explore and compare some e-learning online platforms that offer inclusively PM-related educational materials.

An exploratory qualitative method will be used for this applied research. Each identified e-learning platform will be described based on process-oriented interrogations, and afterwards compared with the other ones to help conclude which e-learning materials are best to be used by project managers nowadays, following their educational needs.

Literature review

In today's complex work environment, there is a gap between what is needed in projects and what education providers are offering (Ramazani & Jergeas, 2015). The implementation of e-learning platforms with web interfaces allows students and instructors to access learning content, tests, communication and collaboration tools, course management and assessment facilities (Piotrowski, 2010). Software systems that support and facilitate e-learning are also known as learning management systems (LMS) or learning platforms (LP).

PM study materials can be found online in the form of plain text, video and audio content on websites, online courses, blogs and podcasts. The online courses are available on online platforms, which offer either various study materials from different fields including PM, or exclusively PM content (Singh, 2019). Most online courses in this area are only available for a fee: users are required to pay for a course, module, or get a monthly or annual subscription to the platform.

There have been conducted many comparisons between different e-learning platforms, such as the ones below, but none of them targeted specifically the PM component:

- e-learning platforms (Ruiz Reyes et al., 2009), based on adaptivity, functionality, didactic issues:
 - open source, compared also by user friendliness: Atutor, Ilias, Moodle, Dokeos, Claroline, Docebo;
 - closed source: Sumtotal, Saba, Blackboard, Giunti Labs, Plateau;
- open-source e-learning platforms for academic environments (Choudhury & Khataniar, 2016), compared by course development features, productivity and administrative features: Moodle, Dokeos, eFront, Ilias Sakai, Olat and A-View;
- free e-learning platforms (Ouadoud et al., 2016), compared by utility characteristics as functional suitability, compatibility, and portability: Atutor, Claroline Connect, Moodle, Sakai;
- various web and mobile-based e-learning platforms (Emang et al., 2017), based on 4 criteria of usability testing (aesthetics, interactivity, personalization,

layout): Duolingo, E-learning USM, Khan Academy, Open Learning Malaysia (MOOCS), Cisco Networking Academy (Cisco NetAcad);

- e-learning platforms for IT projects (Bradau, 2019), compared by productivity, administrative and functional features, through criteria such as course availability (online/offline), customization, usage analytics, certifications, scalability, collaboration, contests, social impact, language support, open-source: Git Hub, Stack Overflow, Pluralsight, HackerRank, Udacity, Coursera, Code Academy, FreeCodeCamp, Treehouse, W3schools;
- open-source LMS (Ramadhan, 2019) based on functionality features such as content management, course tracking, integrations, licence, communication, virtual classroom, gamification, mobile-friendliness, assessment: Atutor, Ilias, Moodle, Sakai, Claroline.

Methodology

To help achieve the research objectives, formulated in the introduction, the exploratory qualitative method used for applied research is the inductive approach - inductive reasoning. Based on the questionnaire of a group of software project managers (Postelnicu et al., 2019), 13 online platforms were chosen to be studied: Alison, Brain Sensei, Coursera, Cybrary, edX, Lynda.com (LinkedIn Learning), Master of Project Academy, Pluralsight, PMI, Simplilearn, Skillsoft, Udemy and Velociteach.

Some of them are Registered Education Providers (REP) which offer training for the Project Management Institute's (PMI) certifications exams. REPs have to offer these training: for over a year, through instructors who have relevant certifications for training, whose contents are compliant with the latest Project Management Body of Knowledge (PMBOK) and other PMI standards (Lynch, 2018). REPs pay to PMI for maintaining their REP status an annual fee.

PMI is the world's leading PM organization and it offers 8 certifications: Project Management Professional (PMP)[®], Program Management Professional (PgMP)[®], Portfolio Management Professional (PfMP)[®], Certified Associate in Project Management (CAPM)[®], PMI Professional in Business Analysis (PMI-PBA)[®], PMI Agile Certified Practitioner (PMI-ACP)[®], PMI Risk Management Professional (PMI-RMP)[®] and PMI Scheduling Professional (PMI-SP)[®]. Besides these, there are also other popular PM certifications (Florentine, 2019), such as Certified Scrum Master (CSM), CompTIA Project+ or PRINCE2 Foundation/Practitioner.

Specific project goals can be reached depending on the chosen PM methodology, (Wrike, n.d.) such as traditional (e.g. Waterfall), PMI/PMBOK (Project Management Institute, 2009), Agile (e.g. Agile, Scrum, Kanban), process-based (e.g. Lean, Six Sigma, Lean Six Sigma), other (e.g. PRINCE2). Some Agile projects can follow techniques (Bennison, 2008), project life cycle and processes outlined in the PMBOK[®] (Sliger, 2008).

Chosen online platforms

In this chapter is described each one of the 13 preferred online learning platforms, along with a list of their PM-related courses. All the information below, including offers and prices (expressed in Euros or US Dollars), has been gathered during the month of May 2020 from the websites of the respective online platforms. Each resource is being followed by the number of its corresponding access link in square brackets from the annexe links list.

Alison was founded in 2007 in Ireland and is a free online learning platform with over 15 million learners in over 195 countries and 2.5 million graduates. It offers more than 1500 free online courses from different domains such as Information

Technology, Foreign Languages, Science, Health, Humanities, Business, Math, Marketing and Lifestyle. Alison is not a PMI-REP, nor does it offer corporate solutions, however, it does provide a blog, a mobile application for Android devices and PM-related materials such as [1], [2], [3], [4], [5], [6], [7].

Brain Sensei is a PMI-REP e-learning platform which uses an animated story with a female Samurai from Feudal Japan who overcomes adversity to reinforce key PM concepts. Even if there isn't a dedicated mobile application, Brain Sensei's contents are mobile-optimized so their courses can be taken on tablets and phones with an internet connection. They provide individuals with the following PM courses in English, most of which are paid: [8], [9], [10], [11], [12], [13], [14].

Coursera is an online learning platform for individuals and businesses, founded in 2012, offering over 4200 flexible free and paid online courses like interactive textbooks from more than 200 partner universities and companies. Their online community connects 58 million learners who discuss course materials from over 430 specializations, debate ideas and get help. Over 2400 companies use Coursera's business solutions to upskill their employees, providing them English courses subtitled in over 30 languages and from many categories, such as Arts and Humanities, Business, Computer Science, Data Science, Information Technology, Health, Math and Logic, Personal Development, Physical Science and Engineering, Social Sciences and Language Learning. The community benefits of mobile applications for iOS and Android, but also academic and technical support. Even if some courses are free to audit, their corresponding certifications are paid. Most of these courses are free to audit: [15], [16], [17], [18], [19], [20], [21], [22], [23], [24].

Cybrary is free cybersecurity and IT workforce development platform founded in January 2015. It offers more than 500 million learning minutes, certifications and video learning resources from over 1000 industry expert contributors to over 2.5 million registered users. It offers businesses the possibility to implement career development programs for their IT and cybersecurity teams; 96% of Fortune 1000 companies use this platform to build their employees' careers. However, Cybrary is not a PMI-REP and it provides only a free PMP Exam Study Guide which includes comprehensive training in the world of project management [25], and which can be also taken online or offline through their mobile application for Android.

Founded by MIT and Harvard, edX is a global non-profit education platform and an open-source MOOC (Massive Online Open Courses) provider, offering corporate eLearning for organizations. Over 20 million individuals and learners from universities and companies worldwide can learn Computer Science, Languages, Data Science, Business & Management, Engineering, Humanities in English and Spanish using edX's Android and iOS mobile applications, or take their Master Degree in Leadership Service Innovation, Accounting, IT Management, Marketing, Cybersecurity, Analytics, Data Science, Computer Science. EdX's PM-related materials are: [26], [27], [28], [29], [30], [31], [32], [33].

Lynda.com is a top online learning platform, which offers solutions for individuals, businesses, academics and government. It can be accessed on a smartphone, tablet, desktop and TV via the corresponding application "Lynda - Online Training Videos" for Android, iOS, Windows, Mac and TV. Its learning contents are offered through a video library with transcripts and have been moved to LinkedIn Learning, thus the courses, instructors and LinkedIn data offer learners a personalized course recommendation system based on their choices and characteristics. After a free month, individuals can continue to have unlimited access to over 15000 courses from numerous domains such as 3D+ Animation, Audio & Music, Business (with various PM courses), Design, Software Development, Education, IT, Marketing, Photography,

Video and Web for €29.49/month or €19.66/month in a yearly subscription. With study materials in five languages, LinkedIn Learning is a PMI-REP, which serves more than 10000 organizations. Their PM-related courses and their corresponding links are: [34], [35], [36], [37], [38], [39], [40], [41], [42], [43], [44], [45], [46], [47], [48], [49], [50].

Master of Project Academy has been awarded as #1 PM Training Online provider by Project-Management.com and 99.6% of their 125,000+ students enrolled so far from more than 180 countries have passed their certifications at the first attempt. Individuals and corporations can train in English using more than 30 project management related courses, 11 of which are free. Certification training, individual courses and courses grouped in bundles can be accessed through monthly, yearly or lifetime subscriptions; fares differ according to the chosen course. Sometimes they have special offers, such as 50% off on all courses and pricing plans. Although not being a PMI-REP, their courses are recognized and approved by PMI as contact hours education requirement for PMP, PMI-ACP and CAPM exams: [51], [52], [53], [54], [55], [56], [57], [58], [59], [60], [61], [62].

Pluralsight is an online technology skills platform for individuals and corporate teams, with more than 1700 employees and apps for iOS, Android, TV, Windows and Mac. Their 7000+ courses, video and assessments are offered in English, are authored by more than 1500 industry experts and are organized in learning paths for different domains, such as Software Development, IT Ops, Data, Information & Cyber Security, Architecture & Construction, Manufacturing & Design. As a PMI-REP, their PMP path is based on the PMBOK® Guide - Sixth Edition and fully covers the objectives of the CAPM exam as well. Individuals can start a free 10 day trial and then continue with a paid subscription: monthly for \$29/month, annual for \$299/year or premium for \$449/year, including projects, certification practice exams and courses such as: [63], [64], [65], [66], [67], [68], [69], [70].

The Project Management Institute was founded in 1969 and has more than 500,000 members around the globe. It delivers value for over 2.9 million professionals worldwide through globally recognized tools, resources, certifications, standards, publications, academic research, networking opportunities and professional development courses, such as [71], [72], [72], [72], [75]. PMI offers a podcast, webinars, seminars, events and can be accessed on mobile/tablet through the mobile application "PMI Live Events" for Android and iOS.

Simplilearn is an online coaching and certification training provider for individuals and companies, with more than 2000 qualified trainers teaching over one million professionals across more than 150 countries. They started in 2009 as a PM blog, then introduced instructor-led virtual classrooms, online training and expanded their management content and certifications. Their learning resources are in Digital Marketing, Cloud Computing, Full Stack Development, Cyber Security, Data Science and PM among others, with 24/7 teaching support and Android and iOS mobile applications. PM resources on their side include articles, certification guide e-books and a PMBOK webinar on-demand, while their popular PM courses include: [76], [77], [78], [79] and other courses such as Digital Project Manager, CAPM, Certified Business Analysis Professional (CBAP), Certification of Capability in Business Analysis (CCBA), PMI-RMP and Managing Successful Programmes (MSP).

Skillssoft is a PMI-REP global provider of cloud-based learning and support resources which started in 1998. Learners can access tools in 29 languages, such as courses, industry events, webinars and live events organized worldwide. Almost 700 learning paths of content are updated regularly on Percipio, their online Learning Experience Platform (LEP). Pricing information for this particular online LEP is not publicly available on the website; however Skillssoft offers a demo or a 60 days free trial (previous to

COVID-19 it was only 14 days) and its content can be accessed on mobile or tablet through the mobile applications "Skillsoft Learning App" and "Percipio", available on Android and iOS. Their business certification catalog includes CompTIA Project+, CAPM, PMI-ACP, PMP, PRINCE2 and Six Sigma Yellow/Green/Black Belt, but also PM courses: [80], [81], [81], [83][84], [84], [84], [86].

Udemy is a global learning and teaching marketplace for individuals and companies, connecting them with 57.000 instructors and 33 million minutes of video from 150.000 online courses in more than 65 languages. They offer a blog, a mobile application for Android and iOS, research reports and a tech platform called "Medium". Personalized recommendations can be made in many categories, such as Business, Software Development, IT, Personal Development, Design, Marketing, Lifestyle, Photography, Music, Health and Fitness, Teaching and Academic Activities. Their PM portfolio includes a lot of courses from different vendors - some of which are PMI-REPs - such as: <https://www.udemy.com/the-new-manager-managing-people-teams-processes/>[87], [88], [89], [90], [91], [92], [93], [94], [95], [96], [97], [98], [99], [100], [101]. When accessed, most of the Udemy paid courses could have been purchased under a "new student" deal with up to 90% off; that's why the initial price for some of the paid courses above has been €10.99 for a limited time.

Velociteach is a PM education and certification company founded in 2002, which offers an online platform with blog, podcast, e-learning programs, training kits for certification and licensing for outside trainers. This PMI-REP's materials are in line with PMBOK Guide released by PMI and can be accessed through their Android and iOS mobile application "Velociteach TotalPrep". Some of their PM-related courses include: [102], [103], [104], [105], [106].

Results

The above findings have been summarized into two tables with comparisons of the chosen online platforms offering PM-related courses, in order to help conclude which e-learning materials can bring more value if used by project managers nowadays.

Table 1 shows the comparison of identified and explored PM materials from the chosen online platforms based on:

- functionality: PM methodologies and certifications, course development features;
- costs per material or per period of time.

Table 2 shows the comparison of the chosen educational platforms based on aspects and criteria such as:

- financial aspect - open/closed source;
- compatibility, portability - mobile application;
- content management - PMI REP, PM materials inclusively/exclusively;
- accessibility - language support;
- integration - for business/corporate or only for individuals.

Table 1
Online Platform / Course Matrix

Platform / Course	PM generic	PMP Certif.	Lean	Six Sigma	LSS	PRINCE2	Agile	Scrum	Other/Obs.
ALISON	[1],[2],[3] FR, [4] AR		[5]	[6]					[7] – all free
Brain Sensei	0-\$65 * [9]-\$100 [10]-\$175 [11]-\$90 [12]-\$175 [13]-\$65	[14]-\$500							* 100% sale All in EN
Coursera	[15] EN w. subtitles	[16]-\$2980 or \$777 for 1/4 courses	[17] [18]	[18] [20]	[21]		[22]	[23] RU	[24] - all in EN, all free to audit, except [16]
Cybrary edX	[26]-\$199* [27]-\$199* [28]-\$810 / \$900	[25]	[29]- \$264.03 / \$297				[30]- \$895.5 / \$995		[31]-\$268.2 [32]-\$537.3 [33]-\$99* * free audit, paid certification
Lynda .com		[34] [35]	[36]	[37] [38] [39]	[40] [41] [42]	[43] [44] [45]	[46] [47]	[48] [49] [50]	1 month free, €29.49 / M, €235.92 / Y
Master of Project Academy		[51]-free [52]-\$83/M or \$457/Y or \$777/life		[53]-free	[54]-\$62/M \$327/Y \$570/life	[55]-free [56]-\$107/M \$857/Y \$1470/life	[57]-free [58]-\$67/M \$357/Y \$627/life	[59]-free [60]-\$52/M \$237/Y \$457/life	Paid bundles: [61] [62]
Plural-sight	[63]	[64]			[65]	[66]	[67]		[68][69][70] Free 10day trial, \$29/M, \$299/Y or \$449/Y Prem.
PMI	[71]-\$400 / \$350 [72]-\$350 / \$300	[72]-\$740 / \$540					[74]-\$249 [75]-\$372/ \$243		Lower price only for PMI members.
Simpli-learn		[76]-€699 or €1399 /life [77]-€1599/3Y				[78]-€999 or €1499 /life		[79]	
Skillsoft	[80], [81], [81]	[83], [86]		[86]		[84], [86]	[84]		Free 60 day trial, pricing not available
Udemy	[87]-€13 [88]-free	[89]-free [90]-€15 [91]-€200	[92]-€120 [93]*		[94]*[95]*[96]*[97]* [98]-€200		[99]* [100]*	[101]*	* €10.99
Veloci-teach		[102]-\$388.8 /1M or \$540.8 / 3M \$660.8 / 6M	[103]-\$39 / 6M				[104]-\$144/6M [105]-\$29/ \$59/\$79*	[106]-\$84 / 6M	PM training * Prices for 1W/1M/3M

Note: Courses available in languages: EN = English, FR = French, AR = Arabic, RU = Russian.
W = Week, M = Month, Y = Year, \$ = US Dollar

Source: All links from Annex

Table 2
 Characteristics of the Chosen E-learning Platforms

Platform	Open/closed source	Mobile app	PMI REP	PM only	Language support	Business/Corporate
ALISON	Free	Android	No	No	EN,FR,AR	No
Brain Sensei	Paid	No	Yes	Yes	EN	No
Coursera	Free & Paid	Android, iOS	Only for [15]	No	EN + other subtitles	Yes
Cybrary	Free	Android	No	No	EN	Yes
edX	Free & Paid	Android, iOS	RIT courses	No	EN, ES	Yes
Lynda.com	Free 1 st month & Paid	Android, iOS, Windows, Mac, TV	Yes	No	EN, other	Yes
Master of Project Academy	Free & Paid	No	No	Yes	EN	Yes
Pluralsight	Free 10-day trial & Paid	Android, iOS, Windows, Mac, TV	Yes	Yes	EN	Yes
PMI	Paid	Android, iOS	Itself	Yes	EN, other	Yes
Simplilearn	Paid	Android, iOS	Yes	No	EN	Yes
Skillsoft	Free 60-day trial & Paid	Android, iOS	Yes	No	EN	Yes, B2B mostly
Udemy	Free & Paid	Android, iOS	No	No	EN, other	Yes
Velociteach	Paid	Android, iOS	Yes	Yes	EN	Yes

Note: PMI REP = Project Management Institute Registered Education Provider.

Courses available in languages: EN = English, ES = Spanish, FR = French, AR = Arabic.

RIT = Rochester Institute of Technology

Source: All links from Annex

Table 1 and Table 2 show the following:

- The most complex online platform of those presented is Lynda.com (LinkedIn Learning) because it offers courses useful in many PM methodologies: Waterfall (PMI), processes (Lean, Six Sigma), Agile (Agile, Scrum), PRINCE2 as PMI-REP, but also courses in other domains. Other reasons why it is considered complex are that it offers the widest variety of applications: mobile, desktop and TV, it offers business solutions and courses in several foreign languages, and even free access to courses, for a limited period of time.
- Among the analyzed platforms that offer paid courses, Lynda.com charges the least in relation to the volume of accessible content per month (\$29.49) but also per year (\$235.92).
- Among the presented platforms that allow unlimited free auditing of PM courses, Coursera and Master of Project Academy have the richest portfolios.
- Almost all these platforms offer PMP certification courses, and in 2nd place in popularity among certifications are Agile and Scrum.
- Lean and Six Sigma courses are among the least marketed on the analyzed platforms.

Discussion and conclusion

The information presented in the Methodology and Results from chapters above contributed to the achievement of the paper objectives: identity, explore and compare some e-learning online platforms that offer inclusively PM-related

educational materials. The author provided a general overview and details of some existing online materials and resources appropriate for PM training and continuous education, under the "Chosen Online Platforms" sub-chapter. The identified and explored PM materials from the chosen e-learning platforms were compared based on functionality and costs in Table 1. The chosen e-learning platforms were compared in Table 2 based on compatibility, portability, content management, accessibility, integration and financial aspect.

This paper offers an overview on which e-learning materials are best to be used by project managers nowadays, following their educational needs, based on some pre-selected educational online platforms. As project management is distinguished as a critical business competency in the digital age we're living in, it is also critical to choose a reliable source of materials so that the project manager's decision on the source to be used would be an informed one.

This article has been developed as part of an ongoing PhD research at the Politehnica University of Bucharest related to the use of online technologies in PM, to help define the current stage of the research thesis entitled "Research on the use of online technologies in project management". In the next stage of the doctoral research, different software programs and digital tools used by IT project managers will be analyzed, provide them with a new comparative table (in addition to the two tables discussed in this paper) to facilitate decision-making when choosing a way to learn and practice project management.

Appendix

List of platforms and courses links, accessed on May 18th 2020

- [1] Alison, Introduction to Modern Project Management Theory and Practice, alison.com/course/introduction-to-modern-project-management-theory-and-practice-revised
- [2] Alison, Diploma in PM, alison.com/course/diploma-in-project-management-revised-2017
- [3] Alison, Introduction au Management de Projets (French Language), alison.com/course/introduction-au-management-de-projets-version-fran%C3%A7aise
- [4] Alison, Fundamentals of Project Management - Arabic Version, alison.com/course/fundamentals-of-project-management-arabic-version
- [5] Alison, Applied Operations Management -Line Balancing And Facilities Location, alison.com/course/applied-operations-management-line-balancing-and-facilities-location-revised
- [6] Alison, Diploma in Six Sigma, alison.com/course/diploma-in-six-sigma-revised-2017
- [7] Alison's Free Project Management Hub, alison.com/learn-project-management
- [8] Brain Sensei, Module 100 – Project Management Overview, brainsensei.com/product/module-one-project-management-overview/
- [9] Brain Sensei, Module 101: Initiating Projects, brainsensei.com/product/module-two-initiating-projects/
- [10] Brain Sensei, Module 102: Planning Projects, brainsensei.com/product/module-three-planning-projects/
- [11] Brain Sensei, Module 103: Executing Projects, brainsensei.com/product/module-four-executing-projects/
- [12] Brain Sensei, Module 104: Monitoring & Controlling Projects, brainsensei.com/product/module-five-monitoring-controlling-projects/
- [13] Brain Sensei, Module 105: Closing Projects, brainsensei.com/product/module-six-closing-projects/
- [14] Brain Sensei, Complete PMP® Exam Prep Course, brainsensei.com/product/complete-pmp-exam-prep-course/
- [15] Coursera, Project Management Principles and Practices, coursera.org/specializations/project-management
- [16] Coursera, Professional Certificate – Applied Project Management, coursera.org/professional-certificate/applied-project-management
- [17] Coursera, Lean Software Development, coursera.org/learn/lean-software-development
- [18] Coursera, The hidden value – Lean in manufacturing and services, coursera.org/learn/lean-manufacturing-services
- [19] Coursera, Six Sigma Yellow Belt, coursera.org/specializations/six-sigma-fundamentals
- [20] Coursera, Six Sigma Green Belt, coursera.org/specializations/six-sigma-green-belt
- [21] Coursera, Data Analytics for Lean Six Sigma, coursera.org/learn/data-analytics-for-lean-six-sigma
- [22] Coursera, Agile Planning for Software Products, coursera.org/learn/agile-planning-for-software-products
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- [26] edX, Introduction to Project management, edx.org/course/introduction-to-project-management

- [27] edX, Results-Based Project Management: Monitoring and Evaluation, edx.org/course/results-based-project-management-monitoring-and-ev
- [28] edX, RIT Project Management, edx.org/micromasters/ritx-project-management
- [29] edX, Lean Six Sigma Yellow Belt: Quantitative Tools for Quality and Productivity, edx.org/professional-certificate/tumx-six-sigma-and-lean
- [30] edX, Agile Project Management, edx.org/professional-certificate/umd-usmx-agile-project-management
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