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Instructional design and project management: complementary or divergent?

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Abstract This paper reports the results of a study to identify the extent to which organizations that develop educational/training products are committed to project management, as measured by their project management implementation maturity, as a methodology that is separate and distinct from the processes of instructional design. A Web survey was conducted among 103 public and private sector organizations worldwide that develop educational/training products. Results show no significant difference by project management maturity level in the roles of instructional designer and project manager, although there is some relationship between maturity level and how organizations perceive the skills/competencies of project managers versus those of instructional designers. Further, organizational decision-makers have very specific expectations about the formal education and training of educational/training product development project leaders. The findings should be of value to institutions of higher education in evaluating programs that prepare students for careers in instructional design.

Keywords Instructional design · Project management · Courseware development · Educational product development · Training product development

Introduction

Despite the economic downturn, employers continue to invest in employee professional development. The American Society for Training & Development (ASTD) estimates that U.S. organizations spent $134.1 billion on employee learning and development in 2008, nearly on a par with the $134.39 billion spent in 2007 (Paradise and Patel 2009). These spending levels bode well for educational/training product development projects and for the job market for instructional designers. Further, there are indications that the demand for instructional designers has remained fairly healthy over the past few years compared with

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other professions, with some job boards showing solid increases in the number of posted positions (Indeed.com 2010) while others show no change in the percentage of jobs posted from December 1, 2008 to June 30, 2010).

A browse-by-subject search of GradSchools.com, an online directory of accredited graduate degree programs in the U.S., lists 765 educational technology graduate programs in the U.S. that prepare students for careers in instructional design, along with dozens of programs from international institutions that market online instructional design degrees in the U.S. (GradSchools.com 2010). The standards for instructional design competencies developed by the International Board of Standards for Training, Performance, and Instruction (IBSTI) are among the professional standards to which most advanced degree programs in instructional design adhere, with the ability to plan and manage educational/training product development projects listed among the IBSTI advanced competencies for experienced instructional designers (International Board of Standards for Training, Performance, and Instruction 2000). However, the higher education instructional design curriculum does not generally include formal courses in project management, nor do the program course descriptions give any indication that project management is addressed as a topic in any of the program courses. For example, in a previous study that explored the web sites of each of the U.S. and international educational technology graduate programs listed on the GradSchools.com web site (Williams van Rooij 2010), less than one-quarter (23%) of the graduate-level programs include courses in project management. There are some exceptions, such as the University of Maryland Baltimore County, where the instructional design program is offered by Continuing and Professional Studies, and Boise State University, where the College of Engineering offers an instructional design program. For many institutions, project management courses are to be found in the curricula for business, information technology, or as stand-alone training programs in schools of adult professional education.

Although the instructional design literature is clear about the need to effectively manage educational/training product development projects, most models of instructional design view project management as embedded within the instructional design process, rather than as a separate methodology (Greer 1992; Gentry 1994; Yang et al. 1995; McDaniel and Liu 1996; Stubbs 2002; Li and Shearer 2005). However, project management is a distinct and evolving discipline, with its own methodology, body of knowledge, and professional standards and practices. Further, instructional designer positions require not only instructional design skills/competencies, but also project management skills, including the ability to lead a project team, estimate project requirements, and develop processes and standards for completion of educational/training product development projects.

The methodology of project management

The Project Management Institute (PMI), a global standards and credentialing body for the project management profession, defines project management as the application of a body of knowledge, skills, tools and techniques to project activities to meet project requirements, all of which is documented in the Project Management Body of Knowledge (PMBOK® Guide) (Project Management Institute 2009). Along with the five project management processes—initiating, planning, executing, monitoring and controlling, and closing—effective project management requires knowledge of the project's environment (technology, industry, etc.), as well as general management skills and interpersonal skills. These interpersonal skills, particularly communication skills and leadership skills, are deemed essential to today's successful project manager, where a good portion of project activity

often takes place in virtual environments (Horine 2009). There are also several international organizations that offer project management certification grounded in the same global standards to which PMI adheres (PMForum.org 2010).

Although project management has its strongest presence in industries where projects tend to be complex, multi-year and require extensive human and financial resources (e.g., aerospace, construction, information technology), project management processes and procedures can be used in a variety of industries and for a variety of project types and sizes. Rowe (2007) describes how project management processes and tools can be tailored to fit the needs of small projects, particularly when the project manager must perform multiple functions. Crawford and Pollack (2007) deem project management to be a generic methodology applicable to any type of project in any industry, while Leybourne (2007) points to a growing emphasis on the behavioral elements that impact the management of virtual project teams, such as conflict management and decision-making, and affirms the relevance of project management to a variety of contexts.

How much of the project management methodology do organizations actually use? Thomas and Mullaly (2008) offer a five-level model of project management implementation maturity in organizations derived from case studies of 65 organizations worldwide. Drawing on Humphrey's (1992) Capability Maturity model for software development, Thomas and Mullaly assess the project management maturity of an organization as follows:

- Level 1 (Ad hoc), with no organizational implementation of project management; any use of project management processes depends on the expertise of individual project managers.
- Level 2 (Some practices), with incomplete or inconsistent application enterprise-wide.
- Level 3 (Consistent practices), with a complete project management process in place and applied consistently enterprise-wide.
- Level 4 (Integrated practices), with project management as an integral management capability that is fully integrated with the organizational lifecycle.
- Level 5 (Continually improving practices), with a holistic, fully integrated approach to managing projects with a formal and consistently followed process of evaluating, assessing, and improving project management implementation.

Although the organizations in the Thomas and Mullaly study represent a variety of industries and project types, there is no indication as to whether any of the projects were educational/training product development projects.

Educational/training product development and project management

In developing educational/training products, organizations engage in instructional design (ID), a process guided by systematic design models and principles focused on establishing and maintaining efficient and effective human performance (Rothwell and Kazanas 2008). There is a variety of ID models, ranging from the linear, generic ADDIE model encompassing analysis, design, development, implementation, and evaluation (Conrad and TrainingLinks 2000; Dick et al. 2005; Smith and Ragan 2005), to more iterative, learner-centered models (Piskurich 2006; Baek et al. 2007). ID models define the lifecycle or phases for producing the instructional product. Project management complements the ID process by offering a set of repeatable processes with which to describe, organize and complete the work required for each phase of the product development lifecycle, with deliverable complexity also determining how much process is used at each phase

(Williams van Rooij 2010). As with most products, educational/training product development is normally structured into individual projects (Project Management Institute 2009) that are temporary in duration and result in a unique deliverable as described in the ID document.

Consistent with the success criteria for any type of project, an educational/training product development project is deemed successful if it is delivered on time, within budget, and meets the requirements of the project stakeholders (Rowe 2007; Crawford and Pollack 2007; Horine 2009; Stubbs 2002). Even when the roles of instructional designer and project manager are filled by the same individual, using project management processes enables the project manager to (a) clearly define the project, develop realistic schedules, and manage change, (b) choose those processes, levels of detail, and methodology components appropriate to the specific project, (c) operate in an organized and efficient manner, and (d) have more time to devote to the management of "soft" skills, such as team building.

Knutson et al. (2006) note that the knowledge area skills required to apply project management processes are distinctly different from those of an instructional designer. Brill et al.'s (2006) study of 147 alumni of a private Research university in the northeast who are practicing instructional design project managers includes the ability to apply PMI processes and principles among the core success criteria for educational/training product development projects. The results of that study were part of the authors' business case to create a project management certificate program for their own institution. In a survey of 142 practicing professionals in academic and corporate settings, Cox and Osguthorpe (2003) sought to determine how instructional designers spend their time when working on individual projects, particularly in terms of time spent on managing the project rather than on the design process. Results of their study shows instructional designers spending a great deal of time on project management, particularly in the management of client and other stakeholder expectations.

Looking at the corporate training market, Fabac (2006) makes the case for acquiring project management skills as defined in the PMBOK® Guide, to provide the necessary control functions needed to update the ADDIE model of instructional design. The eLearning Guild, a Community of Practice composed of working professionals employed in the design, development, and management of web-based instructional content for educational, government, and corporate settings, emphasizes the importance of project management skills and practices as outlined in the PMBOK® Guide to increase efficiencies and reduce risk in the courseware development process (Dickinson 2006).

Although professions tend to be defined by (a) a unique body of knowledge that can be studied and learned through formal education, (b) a commitment to ethical behavior as defined within the characteristics of the profession, and (c) a set of defined minimum standards that must be met for entry into the profession (Smith 2003), when it comes to educational/training product development, the boundaries between the instructional design professional and the project management professional are often unclear, with conflicting and/or overlapping roles and responsibilities (Dobrovolny et al. 2002; Layng 1997; Greer 1992). What is needed is a clear outstanding of how those boundaries play out in the real world of work.

Research questions

Examining the boundaries between the instructional designer's role and the project manager's role requires an initial understanding of an organization's commitment to project

management as a distinct methodology. This paper reports the results of a study seeking to explore the extent to which organizations that develop educational/training products are using the project management methodology. The specific research questions were:

- How much of the project management methodology do organizations purport to be using in their educational/training product development projects, as measured by Thomas and Mullaly's (2008) five-level model of project management implementation maturity (PMIM)?
- To what extent does PMIM affect organizational expectations of an instructional designer's skill/competencies as set down by the International Board of Standards for Training, Performance, and Instruction (IBSTI), versus the skills/competencies of a project manager as documented in the Project Management Body of Knowledge (PMBOK® Guide) by the Project Management Institute (PMI)?

Method

This study collected data via an anonymous Web survey of 103 respondents from public and private sector organizations that develop educational/training products for internal use to develop and advance employee skills/competencies, and/or for external clients in corporate, government, or educational settings.

Sampling and data collection

Three segments are essential to the identification of project management maturity in educational/training product projects: (a) project management professionals who lead educational/training product development projects but are not necessarily instructional designers themselves; (b) instructional designers, and; (c) organizational decision makers charged with defining the skills and competencies essential to educational/training product project team leaders (e.g., Chief Learning Officers, Directors of Training and Development). Target respondents were recruited via a purposive sampling of members of the Project Management Institute (PMI), the American Society for Training and Development (ASTD), and the e-Learning Guild obtained through a call for participation message and two reminder messages posted to their respective discussion boards in January–February 2010.

A total of 115 responses were received. However, 12 of those responses were dropped from the analysis because the respondent's organization either did not design/develop educational/training products or the respondent did not answer this screening question. Consequently, a total of 103 responses were retained for analysis. As shown in Table 1, about one-third (33.7%) of respondents are organizational decision-makers, more than one in four (29.6%) are instructional designers, while one in five (21.4%) are project management professionals. The vast majority (76.5%) of respondents are in the United States and are employed by companies and departments of various sizes, with one in four (24.5%) of those companies in the consulting/contracting sector. There are relatively equal percentages of male and female respondents (51.6% and 48.4% respectively), with more than half (57.9%) employed in educational/training product development for 5–15 years.

The sample selection method and sample size place constraints on the utility of the findings for drawing inferences about all organizations that engage in educational/training product development projects. The unit of analysis is the respondent because the sampling

Table 1 Selected sample demographics ($N = 103$)

	Frequency (#)	Percentage (%)
Function/title		
Chief Learning Officer/Vice President/ Director	35	33.7
Sr. Instructional Designer/Instructional Designer	30	29.6
Project Manager (PMP)/Non-PMP Project Manager	22	21.4
All other individual mentions	16	15.3
Geographic region		
United States	78	76.5
All other individual mentions	25	24.5
Organizational setting		
Consulting/contracting	25	24.5
Technology products and services	13	12.2
Academic: postsecondary/higher education	10	9.2
Health care	10	9.2
Financial services	8	8.2
Non-profit	7	7.1
Government (Non-Military)	6	6.1
All other individual mentions	24	19.4
Respondent gender		
Male	53	51.6
Female	50	48.4
Years of educational/training product development experience		
Less than 5	14	14.1
5–15	60	57.9
More than 15	29	28.0

method (a) enables (but cannot verify) more than one individual from an organization to respond and (b) assumes that any respondent is knowledgeable enough about his/her organization to respond to the questions about organizational characteristics, including level of project management implementation maturity, although this possibility is less worrisome given that one-third (33.7%) of respondents are organizational decision makers and as such, are assumed to know what goes on in their respective organizations. This study is also limited in terms of the perspective adopted, namely that of the Project Management Institute's (PMI) methodology and the Thomas and Mullaly (2008) implementation maturity model that is grounded in PMI's constructs. Lastly, the small sample size and the small number of respondents reporting their organizations as having consistent or well-developed project management practices required collapsing the Thomas and Mullaly model from five levels into two levels: Low maturity, combining level 1/ad hoc and level 2/some practices, and; medium/high maturing, combining level 3/consistent practices, level 4/integrated practices, and level 5/continually improving practices. Since the original model is not a Likert-type rating scale with a mid-point, the collapsed categories enabled some inferences about the effects of project management implementation

maturity, although not with the same sharp differentiation as in the original Thomas and Mullaly study. Despite these limitations, the methodology used in this research is a good fit with the research purpose and the specific research questions asked.

Survey instrument and measures

Although Project Management Implementation Maturity (PMIM) is a salient topic in project management research, there are no studies to date that address PMIM in the context of educational/training product development projects. Using keyword combinations of "project management" and "implementation maturity", a search of the PsychInfo, ISI Web of Science, JSTOR, ProQuest, and Emerald electronic databases for peer-reviewed journal articles yielded 767 citations. More than half (422) of the articles addressed PMIM, but most focused on the information technology, defense, and construction industries. None addressed educational/training project management.

Consequently, the survey questionnaire used in this research is a composite of the following sources:

- The self-assessment components of the Thomas and Mullaly (2008) study of PMIM that presented respondents with definitions of each of the five levels and asked them to select the level that best describes the extent to which project management has been implemented in their organization.
- The professional competencies published by IBSTPI and PMI respectively.
- The list of instructional design project manager skills/competencies in Brill, Bishop and Walker's (2006) study of the core success criteria for educational/training product development projects.

In constructing the survey instrument, generally accepted survey creation guidelines were followed (Wiersma 2000). The questionnaire also included closed-ended demographic questions to obtain information about the characteristics of the respondents and of their respective organizations.

Project management implementation maturity was measured by a closed-end, single response question that presented respondents with a definition of each of Thomas and Mullaly's (2008) implementation levels and asking respondents to select the level that best describes their own organization's implementation level. Using the same definitions, respondents were then asked to describe project management implementation in the department or function area of their organization that is responsible for educational/training product development.

To identify expected competencies of project managers and instructional designers, respondents were presented with a list of IBSTPI and PMI competencies and were asked to identify whether each competency is essential for the instructional designer, the project manager, or for both using the following 7-point scale adapted from Zimmerman and Kitsantas' (2005) Perceived Responsibility scale: "1" means "always the project manager"; "2" means "mainly the project manager"; "3" means "slightly more the project manager"; "4" means "both equally"; "5" means "slightly more the instructional designer"; "6" means "mainly the instructional designer", and; "7" means "always the instructional designer".

A draft questionnaire was constructed and uploaded to the web hosting service that would be hosting the finalized questionnaire. To assess the instrument's content validity—a subjective assessment of how appropriate the instrument seems to subject matter experts as well as members of the target population (Litchenham and Pfleeger 2002), a group of six

experts who have published articles in peer-reviewed journals in the fields of instructional design and project management respectively were invited to review the draft survey in October 2009. The most notable outcome of this preliminary validation was the recommendation to eliminate the redundancies in the list of project management and instructional design competency attributes. The questionnaire was revised to reduce the list of competencies from 38 to 24, and was re-loaded to the web hosting service.

Data analysis

Data validation was conducted to test for the presence of data anomalies such as outliers and missing values. Frequency distributions and crosstabs were run to obtain descriptive statistics about respondent characteristics as well as project management implementation at the organizational level and at the departmental level. The attribute list containing instructional designer and project manager skills/competencies was subjected to an item reliability analysis via Cronbach's Alpha, to measure the extent to which the items are related to each other and to obtain an overall index of the internal consistency of the scale (Creswell 2002). The coefficient for the skills/competencies items was .924, which is well above the Social Sciences norm of .7.

A principal component factor analysis was also conducted to examine the validity of the measurement characteristics of the competency scales. As shown in Table 2, the resulting four factors—labeled Project Management Competencies, Instructional Design Competencies, General Business Competencies, and Project-specific Competencies—explained nearly two-thirds (64.2%) of the variance in the original set of 24 items. Items that cross-loaded on two factors indicate skills/competencies deemed to be required of both the instructional designer and the project manager. This result is consistent with the researcher's intention of developing scale items that accurately reflect what the literature deems to be required skills/competencies for educational/training product development project success. The remaining 35.8% of the variance was not accounted for by the four rotated factors and must be presumed to consist of either measurement error or true variance that is unique to individual items.

Principal axis factor analysis was also used to detect structures within the item ratings. The results of that analysis were nearly identical to that of the exploratory factor analysis in terms of (a) the number of factors, (b) which items loaded highest on which factors, and (c) the percentage of explained variance. Table 3 contains the Factor Score Covariance Matrix with the R^2 between each factor and the observed variables on the diagonal. All values in the matrix were above .70, indicating internal consistency of the solution. These results, along with the results of the expert review, support the contention that these scalar items measured what they were intended to measure.

The *t*-test for independent samples was used to detect statistically significant differences in the competency mean scores. All analyses were performed using SPSS version 18.0.

Findings

Reported use of project management/PMIM

The first research question concerns the extent to which organizations purport to be using the project management methodology in their educational/training product development projects, as measured by Thomas and Mullaly's (2008) five-level model of project

Table 2 Summary of exploratory factor analysis results for project management/instructional design competencies using principal components factor analysis with varimax rotation ($N = 103$)

Items	Factors			
	Factor 1 Project Management Competencies	Factor 2 Instructional Design Competencies	Factor 3 General Competencies	Factor 4 Project-specific Competencies
Analyze the characteristics of the project environment	**.605**	−.104	.285	.362
Anticipate and address potential issues before they become critical	**.610**	.320	.335	−.092
Make tradeoffs among competing objectives and alternatives	**.482**	**.415**	.333	.093
Defining and controlling what is (not) included in the project	**.640**	.168	.464	.023
Define, resource and schedule all activities required to accomplish timely project completion	**.759**	−.060	.295	−.114
Plan, estimate, budget and control costs, so that the project can be completed within the approved budget	**.802**	.070	.346	.071
Quality	**.476**	**.402**	.395	.006
Organize and manage the project team, so that team member competencies and interactions enhance project results	**.838**	.151	.278	.021
Ensure timely and appropriate collection and distribution of project information to stakeholders	**.796**	.157	.248	.005
Identify and manage risks that may impact the project	**.766**	.247	.214	.050
Plan and manage educational/training product development projects, including scope, budget, schedule and resources	**.836**	−.026	−.150	.087
Promote collaboration, partnerships and relationships among the participants and stakeholders	**.660**	.362	.023	.098
Provide for the effective implementation of educational/training products and programs	**.664**	.199	−.317	.222
Select and use a variety of techniques for determining instructional content	−.147	**.614**	.117	.453
Analyze the characteristics of existing and emerging technologies and their use in an instructional environment	.206	**.740**	.200	−.098
Select, modify, or create a design and development model appropriate for a given educational/training product development project	.242	**.724**	.087	.116
Select and use a variety of techniques to define and sequence the instructional content and strategies	.049	**.845**	.155	.238

Table 2 continued

Items	Factors			
	Factor 1 Project Management Competencies	Factor 2 Instructional Design Competencies	Factor 3 General Competencies	Factor 4 Project-specific Competencies
Evaluate and assess instruction and its impact	.110	**.802**	.022	.308
Communicate effectively in visual, oral and written form	.371	.062	**.520**	.330
Apply current theory to solve practical problems	.224	.213	**.787**	.136
Identify and resolve ethical and legal implications of educational/training product development in the workplace	.265	.351	**.453**	.081
Conduct a needs assessment to identify the perceived gap between an existing situation and the desired situation	−.012	.103	.186	**.816**
Apply fundamental research skills to educational/training product development projects	.065	.203	.351	**.445**
Identify and describe target population/ learner characteristics	.159	.293	−.159	**.786**

Bold shows highest loadings of each attribute

Table 3 Factor score covariance matrix for project management/instructional design competencies using principal axis factoring, varimax rotation with Kaiser normalization ($N = 103$)

Factor	Project management competencies	Instructional design competencies	General business competencies	Project-specific competencies
Project management competencies	**.934**	.014	.062	.005
Instructional design competencies	.014	**.877**	.034	.069
General business competencies	.062	.034	**.768**	.002
Project-specific competencies	.005	.069	.002	**.777**

Bold shows highest loadings of each attribute

management implementation maturity (PMIM) To that end, respondents were presented with Thomas and Mullaly's (2008) five-level model and were asked to select the level that best describes their organization's PMIM. Nearly two-thirds (61%) reported low (ad hoc or some practices) PMIM levels. When asked to describe the extent to which project management has been implemented in the department or function area responsible for educational/training product development, about half (51.3%) described those areas as having

low PMIM levels. Only about one in four respondents characterized either their organization or their educational/training product development department as having a high level of PMIM.

Looking at PMIM at the departmental/functional level, there are some demographic differences (see Table 4). Although Chi-Square testing revealed no significant differences, respondents reporting a medium or high PMIM in the departments/functional areas responsible for educational/training products tended to be responsible for their organization's learning and development strategy, budgeting, and staffing. They tended to be employed in higher education, telecommunications, and the non-military sector of government. Their organizations tended to have 500 or more employees in total, and had 21 or more employees in the educational/training product development area. Organizational-level PMIM showed similar differences, although not as pronounced as at the departmental/functional area level.

Respondents were then asked whether the roles of instructional designer and project manager are fulfilled by the same individual or by different individuals. Although 4 in 10 (40.2%) respondents stated that in their organization, the instructional designer fulfilled both the roles, there were some differences when looking at the responses by project management implementation maturity level. Table 5 shows that as expected, the percentage of respondents reporting that the project manager and the instructional designer were each fulfilling separate roles was significantly higher—$\chi^2(9, N = 103) = 240.00$, $p = .000$—in organizations characterized by a medium or high level of PMIM in the

Table 4 Selected sample demographics by departmental/functional area PMIM

	Low maturity[a] ($n = 56$)	Medium/high maturity[b] ($n = 47$)[c]
Respondent's primary focus		
Responsibility for an enterprise-wide learning & development strategy, budget & staffing	24.3%	44.4%
Working on educational/training product development projects, either as a team member or team leader	75.7%	55.6%
Industry		
Higher education	2.4%	20.0%
Telecommunications	0%	8.6%
Government/non-military	2.4%	8.6%
Company size		
Less than 100 employees	28.6%	17.7%
101–500	18.7%	14.9%
501–1,000	17.1%	15.3%
1,001–5,000	21.3%	32.1%
More than 5,000	14.3%	20.0%
Area size		
Less than 5 employees	37.5%	22.9%
5–20	32.5%	22.9%
21–50	20.4%	34.3%
More than 50	9.6%	19.9%

[a] Low Maturity = Ad hoc/level 1, some practices/level 2

[b] Medium/High Maturity = Consistent practices/level 3, integrated practices/level 4, or continually improving practices/level 5

[c] Caution: Small cell sizes

Table 5 Fulfillment of instructional designer and project manager roles by departmental/functional area level PMIM

	Total respondents (%) ($N = 103$)	Low maturity[a] (%) ($n = 56$)	Medium/high maturity[b] (%) ($n = 47$)[c]
Instructional designer fulfills both roles	40.2	43.9	36.4
Project manager fulfills both roles	11.0	14.6	9.1
Project manager and instructional designer each fulfill separate roles	28.0	17.1	39.4**
Some other arrangement	20.8	24.4	15.1

[a] Low Maturity = Ad hoc/level 1, some practices/level 2

[b] Medium/High Maturity = Consistent practices/level 3, integrated practices/level 4, or continually improving practices/level 5

[c] Caution: Small cell sizes

** $p = .000$

department/functional area responsible for educational/training product development. However, among respondents in organizations with a medium/high level of PMIM report, the percentage reporting that reported that the instructional designer fulfills both roles is similar to the percentage reporting that separate individuals fulfill those roles.

The voluntary comments of medium/high PMIM respondents stating that their organization had "some other arrangement" for determining the distribution of roles, centered on project size and complexity. Typical comments included the following:

- Sometimes the role is combined, sometimes the role is separate. It depends on the difficulty of the content and the size of the project.
- It depends on the project. On smaller projects the instructional designer is usually the project manager. On larger projects, there is usually an instructional designer and a project manager.
- It depends on the scope of the project. Large projects require separate roles.

In contrast, the voluntary comments of low PMIM respondents with other arrangements focused on organizational business models rather than project size and complexity. Typical comments from the low PMIM respondents included the following:

- We use a project manager and a business SME.
- We rely on outside vendors for project management.
- We have an instructional designer fulfilling both roles, but we're beginning to look at teasing out the separate roles and perhaps having the instructional designer and project manager be separate staff in future.

PMIM and project management versus instructional design skills/competencies

The second research question concerns the impact of PMIM on skill/competency expectations. To assess the extent to which project management implementation maturity affects the skills/competencies expected of an instructional designer versus those of a project manager, respondents were presented with a list of 24 skills and competencies and were asked to rate whether each area of expertise is more essential for the project manager, for the instructional designer, or for both equally on a 7-point scale: "1" means "always the

Table 6 Mean ratings of project manager and instructional designer skills/competencies by departmental/functional area PMIM

Skill/competency	Low maturity[a] ($n = 56$)	Medium/high maturity[b] ($n = 47$)[c]
Instructional design skills/competencies		
Content	5.95	5.70
Sequencing	5.81	6.08
Research	5.69	5.37
Assessment	5.68	5.48
Design models	5.51	5.04
Target population	5.50	4.63**
Needs assessment	5.24	4.67
Technologies	5.22	4.92
Theory	4.83	4.83
Project manager skills/competencies		
Costs	2.41	2.08
Team management	2.65	2.69
Activities scheduled	2.70	2.73
Information distribution	2.73	2.77
Risk management	2.73	3.12
Project management	2.92	2.54
Collaboration	2.97	3.19
Scope	3.14	3.19
Project environment	3.51	3.27
Both instructional designer and project manager skills/competencies		
Communicate	4.43	4.63
Quality	4.24	3.88
Ethical/legal	3.97	3.80
Implementation	3.81	3.73
Issues	3.65	3.52
Tradeoffs	3.65	3.50

[a] Low Maturity = Ad hoc/level 1, some practices/level 2

[b] Medium/High Maturity = Consistent practices/level 3, integrated practices/level 4, or continually improving practices/level 5

[c] Caution: Small cell sizes

** $p < .05$

project manager"; "2" means "mainly the project manager"; "3" means "slightly more the project manager"; "4" means "both equally"; "5" means "slightly more the instructional designer"; "6" means "mainly the instructional designer", and; "7" means "always the instructional designer".

Looking at the mean ratings in Table 6, it appears that educational/training product development departments/functional areas with low PMIM levels were fairly similar to those with medium/high PMIM levels in selecting the IBSTPI skills/competencies that are essential for the instructional designer. Similar to the patterns indicated in the factor analysis, the instructional designer was expected to:

- Select and use a variety of techniques for determining instructional content (Content)
- Select and use a variety of techniques to define and sequence the instructional content and strategies (Sequencing)
- Apply fundamental research skills to educational/training product development projects (Research)

- Evaluate and assess instruction and its impact (Assessment)
- Select, modify, or create a design and development model appropriate for a given educational/training product development project (Design Models)
- Conduct a needs assessment to identify the perceived gap between an existing situation and the desired situation (Needs Assessment)
- Analyze the characteristics of existing and emerging technologies and their use in an instructional environment (Technologies)
- Apply current theory to solve practical problems (Theory)

At the other end of the spectrum, project managers are expected to possess the following PMI-based competencies:

- Plan, estimate, budget and control costs, so that the project can be completed within the approved budget (Costs)
- Organize and manage the project team, so that team member competencies and interactions enhance project results (Team Management)
- Define, resource and schedule all activities required to accomplish timely project completion (Activities Scheduled)
- Ensure timely and appropriate collection and distribution of project information to stakeholders (Information Distribution)
- Identify and manage risks that may impact the project (Risk Management)
- Plan and manage educational/training product development projects, including scope, budget, schedule, and resources (Project Management)
- Promote collaboration, partnerships, and relationships among the participants and stakeholders (Collaboration)
- Define and control what is (not) included in the project (Scope)
- Analyze the characteristics of the project environment (Project Environment)

Skills/competencies that are expected of both the instructional designer and the project manager are:

- Communicate effectively in visual, oral, and written form (Communicate)
- Identify and apply the relevant quality standards, so that results satisfy project requirements (Quality)
- Provide for the effective implementation of educational/training products and programs (Implementation)
- Identify and resolve ethical and legal implications of educational/training product development in the workplace (Ethical/Legal)
- Make tradeoffs among competing objectives and alternatives (Tradeoffs)
- Anticipate and address potential issues before they become critical (Issues)

Departments with medium or high PMIM levels were significantly more likely than those with low PMIM levels to attribute the IBSTPI competency *Identify and describe target population/learner characteristics* to the project manager than to the instructional designer, $t(64) = 2.23$, $p < .05$. This difference is somewhat surprising since in-depth knowledge of the target population and learner characteristics is not among the PMI-stipulated core competencies of a project manager, but is an IBSTPI-stipulated core competency of an instructional designer. However, the distribution of attribute ratings within the medium/high PMIM segment indicates that knowledge of target population tended to cluster with the other instructional design competencies rather than with the project management competencies.

Table 7 Instructional design and project management knowledge sources expected of team leaders by PMIM decision-makers

	Total decision-makers ($N = 35$)[a]	Low PMIM decision-makers ($n = 16$)[a]	Medium/high PMIM decision-makers ($n = 19$)[a]
College/university graduate-level certificate in instructional design	22.7%	30.0%	16.7%
Masters degree in instructional design	18.2%	30.0%	8.3%
Short instructional design course/workshop from a professional association (e.g., ASTD)	4.6%	8.3%	10.0%
Project management course(s) from a PMI registered provider	4.6%	.0%	8.3%
No formal education/training required	18.2%	8.3%	30.0%
Other mentions	31.7%	.0%	50.0%

[a] Caution, small cell size

To drill down on skill/competency expectations, decision-makers—respondents who stated that their role focused on responsibility for their organization's enterprise-wide learning and development strategy, budget, and staffing—were presented with a list of formal educational/training alternatives and were asked to select the alternative that best describes the type of formal training/education expected of potential leaders of educational/training product development project teams. As shown in Table 7, the majority (60.0%) of decision-makers in organizations with low PMIM expected project team leaders to have post-graduate certification in Instructional Design, either in the form of a Masters degree or a graduate-level certificate from a college or university. Interestingly, nearly one in three (30.0%) required no formal education/training. In contrast, decision-makers in organizations with medium/high PMIM were less likely to select a "best" source of formal education/training, with one in two (50%) offering up their own expectations in the comment box next to the alternative "If other, please specify". Typical comments illustrating a preference for both formal and informal knowledge sources included the following:

- A Masters degree in instructional design or related program such as cognitive science is critical, paired with a proven record of success as a senior instructional designer/project manager in terms of experience (10 years+).
- I look for the combination of Masters-level Instructional Design training and some formal project management training combined with experience leading and managing complex instructional projects.
- A minimum of a Masters or graduate-level degree—prefer it NOT to be in project management. If there is a degree in Instructional Design, then there should be significant experience (3–5) years in order for the candidate to demonstrate their philosophy of educational and curricular design and project management principles and skills.

Decision-makers were then asked how, other than formal education/training, leaders of educational/training product development project teams should acquire the knowledge needed to lead those project teams. Both low and medium/high PMIM respondents mentioned experience in managing educational/training product development projects as the

means of acquiring the knowledge necessary to lead project teams. Typical comments included the following:

- They need actual practice. It helps to have training in project management, but theory isn't enough. People need to see what can go wrong and have some practice running projects.
- Experience (you learn by doing), professional development, attending conferences, tracking lessons learned, learning and listening to others on the team (very important), keeping abreast of the latest research in cognitive science, e-learning, etc.
- They need experience in a variety of approaches in a variety of organizations. They should at least observe failure to get a feel for risk analysis. They need experience in negotiating with stakeholders and gaining stakeholder confidence in their leadership.

Lastly, project team leaders—respondents who identified themselves as project managers (PMP or non-PMP certified)—were asked how they acquired their knowledge of instructional design and project management respectively. Although 10 in 22 project team leaders possessed a formal degree or post-graduate certificate in instructional design, nearly all (8 in 10) were in the medium/high PMIM segment. In terms of project management knowledge, however, project leaders in both PMIM segments acquired their knowledge from a variety of formal and informal sources. Project leaders in the medium/high PMIM segment were more likely than their low PMIM counterparts to have had formal project management training.

Discussion

The purpose of this study was to explore the extent to which organizations that develop educational/training products's are committed to project management as a methodology—as measured by project management implementation maturity (PMIM)—that is separate and distinct from the processes of instructional design. The fairly low levels of project management implementation maturity (PMIM) observed in this study, both enterprise-wide and in the specific departments or functional areas responsible for educational/training product development, may reflect the evolving nature of project management as a discipline. In a review of the development of project management best practices since 1945, Kerzner (2010) notes that project management has become less a series of processes and more of an enterprise-wide strategy used to differentiate organizations from their competitors. This relatively new application of project management has resulted in organization-specific definitions of best practice which, in turn, makes enterprise-wide implementation more complex than just adopting standardized templates and procedures. The churn in applied project management practice is also reflected in Thomas and Mullaly's (2008) finding of great disparity in implementation among different organizations and different project types.

Turner et al. (2009) conducted a study of 280 companies to determine the extent to which those companies apply project management principles and tools. Study results indicate that regardless of industry, the smaller the company, the less robust will be the use of project management processes and tools. The Small Business Administration's criterion for defining a small business is an employee base of 500 or less (U.S. Small Business Administration, n.d.). The organizations in the present study that were more likely to have low project management implementation maturity levels have fewer than 500 employees, while those with medium or high PMIM levels have 500 or more employees. Further, the

number of employees in the functional areas responsible for educational/training product development in the present study tends to be less than 20 for departments with low PMIM levels versus 20 employees or more in departments with medium or high PMIM levels. Consequently, the PMIM levels found in this study appear to be in line with what the literature states about the project management maturity levels of small versus medium and large firms.

In addition, the study finding that education/training departments with medium or high PMIM levels tend to be in the telecommunications and government sectors is consistent with the historical development of the discipline of project management. A new insight is the finding that higher education is also strongly represented among medium/high PMIM level departments. This may reflect the fact that higher education is the leading provider of instructional design professionals (GradSchools.com 2010), with departments and functional areas that engage in instructional design projects to support teaching and learning at their respective institutions.

The apparent tendency of respondent organizations with low PMIM levels to have the instructional designer fulfill his/her own role plus the role of project manager is also to be expected given the size and relatively small number of staff in the organizations. What was not expected was the finding that responding organizations with a medium or high level of PMIM appear to be as likely to have the instructional designer fulfill both roles as they are to have separate individuals fulfill those roles. One explanation may lie in the respondents' own roles in their respective organizations. Respondents in the medium/high PMIM segment were more likely than those in the low PMIM segment to include decision-makers responsible for the organization's learning and development strategy, budget and staffing. As such, these respondents would tend to be more knowledgeable about which projects require what functional roles. This assumption of knowledge seems to be supported by the voluntary comments in which medium/high PMIM decision-makers linked the project leadership role to the size and complexity of a specific project.

The fact that the study revealed no significant differences between the low and medium/high PMIM segments on the skills/competencies expected of an instructional designer versus a project manager suggests a general consensus as to the expected knowledge base of instructional designers and project managers respectively. A more puzzling finding is the apparent disconnect between decision-maker expectations about how candidates for leadership of educational/training product development project team should acquire their knowledge of instructional design and of project management, and how practicing project team leaders acquire their working knowledge of project management and instructional design respectively. On the one hand, decision-makers in both the low PMIM and the medium/high PMIM segments expect team leaders to have an advanced degree in instructional design or related field (e.g., cognitive science) plus solid experience in managing complex educational/training product development projects. However, they do not require formal education/training in project management and seem to emphasize "learning by doing" as the means of acquiring project management experience. On the other hand, project team leaders reporting college/university education/training in instructional design appear to be concentrated in the medium/high PMIM segment, while those in the low PMIM segment report relatively limited formal/education in instructional design. Further, project team leaders in both PMIM segments have had formal as well as informal training in project management. This suggests that practitioners deem formalized project management knowledge as the "ticket to entry" for project team leadership, affording them the opportunities and grounding to gain project management experience.

One possible explanation for this disconnect lies in the disciplines that offer formal project management education versus those offering formal instructional design education. Project management has its roots in production industries and the military, then diffused to other commercial entities and organizations. As such, project management is a natural fit with the curricula of degree and certificate programs that educate professionals for those industries (e.g., Business, Engineering). Instructional design programs, however, are usually offered by colleges of Education whose long-standing mission has been the education of teachers, the development of education leaders, and the advancement of teaching excellence. Although these programs have evolved to capitalize on the teaching and learning affordances of technology and prepare students to design instruction in a variety of settings and environments, the notion that instruction is a product that requires process management beyond the processes provided by instructional design models, is not a good fit with the values, beliefs and shared assumptions of the discipline (and sub-disciplines) of Education prevalent in the U.S. (Williams van Rooij 2010).

Conclusions

This study provides insights into the reported usage of project management methodology and perceived competencies and roles of project managers and instructional designers in educational/training product development project teams. However, the study does have limitations. The study is constrained by the relatively small number of organizations that responded to the survey. The associations to which the call for participation was issued collectively have nearly two million active members representing a diversity of organizations, industries, and geographic regions. As such, the results obtained from the survey sample are not generalizable to either the association memberships or to specific categories in the data (industry sectors, occupational groups, etc.). In addition to the hypotheses offered in this study, there may be alternative hypotheses about why elements of managing projects were embedded into instructional design models rather than as separate but complementary processes. Nevertheless, comparison with other studies facilitated interpretation of the findings and allowed a richer picture of the observed phenomena to emerge.

The study also signals opportunities for future research. For example, a scale-up of this study to a larger sampling of target respondents would enable an analysis of PMIM by various sample segments. The impact of industry, region (including national versus international organizations), and other organizational characteristics on PMIM is a research opportunity area. The path to project team leadership of instructional designers with advanced degrees and limited/no formal project management training versus those with formal project management training is another area that should be tracked. Similarly, the path to team leadership of project managers without advanced degrees in instructional design but with formal project management training should be tracked. A comparison of the two paths would help determine which combinations of formal/education training take priority in the selection of educational/training product development project team leaders. It would also contribute to the exploration of the impact of gaps in project management competencies among graduates of instructional design degree and certificate programs.

The findings from this study should contribute to the dialog about how institutions of higher education keep the scope of their offerings in instructional design degree and certificate programs targeted toward practititoners current with the needs of the job market. By the same token, the impetus for the inclusion of project management courses in the

instructional design curricula needs to be stressed by the project management community. For example, the Project Management Institute (PMI) could do a much better job of advocacy with educational institutions, generating awareness beyond the traditional disciplines of business, information technology, etc. PMI has begun to take steps in this direction through its educational foundation (Project Management Institute Educational Foundation 2008) offering a project management training fellowship program to assist in-service primary and secondary school teachers and administrators in learning the fundamentals of project management. The goal of the program is to enable teachers and administrators to utilize project management in schools and/or classrooms as a means of enhancing the education of students learning 21st century skills. It is hoped that efforts such as this will contribute to the ongoing dialogue about the relationship between instructional design and project management, and that the skills/competencies of the two professions are increasingly seen as complementary rather than divergent.

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