

Chapter 2

Analysis

Synopsis

This chapter briefly describes and analyzes 102 studies of ID practices. After an extensive literature review, three categories of studies of ID practices emerged: (a) ID professional, (b) ID student, and (c) ID expert and novice differences. ID professional studies are organized by the following five guiding questions: (a) *How do ID professionals design?*, (b) *What competencies are required of ID professionals?* (c) *How do ID professionals collaborate?* (d) *What are the internal processes of ID professionals?* and (e) *What are the external roles of ID professionals?* ID student studies are arranged by three guiding questions: (a) *How do ID students design?* (b) *What are effective ways to teach ID?* and, (c) *Can a particular intervention improve ID student learning?* ID expert and novice differences studies include two guiding questions: (a) *What are the differences between an expert instructional designer and a novice instructional designer?* and (b) *How do novices gain ID expertise?* After briefly describing these studies, this chapter analyzes their impact based on individual citation ranking, publication year trends, types of research methods, and the journals that published these studies.

Identifying Relevant Studies of ID Practices

Multiple steps were employed in identifying the final list of research studies. First, a detailed search was used with two research databases, Education Research Complete and ERIC. Keywords from three recognized studies of ID practices (Kirschner et al. 2002; Rowland 1992; Wedman and Tessmer 1993) were considered. Keywords from articles from initial searches also were noted and added to the overall keyword search list. The final keyword list included the following Boolean search: “instructional design” or “instructional systems design” in the Subject field and “designer”, “expert”, “heuristics”, “instructional technologist”, “novice”, “practitioner”, or “real world” in the Title field. In addition, a keyword search using “instructional design” and “theory” in the Title field, as well as a

keyword search using “instructional design” in the Title field and “case studies” in the Subject field were used. These searches yielded a total of 696 peer-reviewed journal articles, conference papers, proceedings, and reports.

To augment these database searches, ancillary searches (i.e., identifying additional citations from references from previously identified articles) were completed. In addition, cited references from all of the selected articles identified by Google Scholar were reviewed. Moreover, a manual search of the following journals and publication from 2002 to 2013 was conducted, including, *Australian Journal of Educational Technology* (2002–2003), *Australasian Journal of Educational Technology* (2004–2013), *British Journal of Educational Technology*, *Canadian Journal of Learning and Technology*, *Educational Media International*, *Educational Technology*, *Educational Technology Research and Development*, *Instructional Science*, *International Journal of Training & Development*, *Journal of Applied Instructional Design*, *Journal of Educational Technology and Society*, *Journal of Learning Design* (2005–2014), *Journal of Research on Technology in Education*, *Performance Improvement*, *Performance Improvement Quarterly*, *TechTrends*, *Turkish Online Journal of Educational Technology*, and the recent *Handbook of Research for Educational Communications and Technology* (Spector et al. 2014). This additional search was to identify a potential article that may not have been properly identified in the initial database search.

The intent of this comprehensive search was intended to identify an exhaustive list of relevant studies involving ID practices. The year, 2002, was selected as the starting date for this review based on Kirschner et al. (2002) earlier abbreviated review of instructional design practice research.

As a result of this multi-search strategy (including the database and manual searches), 361 articles (excluding duplicates) were fully reviewed according to the specific criteria. The initial intent of this search was broad with the goal of casting a wide net of a variety of articles. However, the final selection was based on the following decision points. First, a *finalist* needs to be published as a journal article in a reputable journal. A journal article also needed to report on an actual research study with data collected from respondents. The final selection of studies of ID practices did not include case studies based on individual or personal ID experiences, such as, Christensen’s (2008) and Hodges’ (2006) respective studies. It also did not include individual ID design cases found in the *International Journal of Designs For Learning* and other journals. As noted by Boling (2010), these particular design cases “are *not* research on design” (p. 2) [emphasis added]. These design cases provide valuable information on design practices, but the context of a particular case should not be generalized. Boling and Smith (2011) aptly remarked:

We would not study a single design in a single context, or the process of creating a single design, and then attempt to generalize principles from that study to all other designs or even to all other designs of that general type. We would study more individual designs in context and disseminate rich descriptions of those designs as valuable contributions to the expertise of all designers in the field (p. 362).

It should be noted that some of the excluded articles on the role and purpose of ID (e.g., Gibbons et al. 2014; Molenda and Boling 2008; Willis 2011) were

summarized in Chap. 1 to provide context in analyzing these studies. In addition, a research journal article needed to focus on professional instructional designers or IDT students, not other educational professionals or students. For instance, Cennamo and Brandt (2012) studied the effects of studio-based instruction that involved architecture, industrial design and human-computer interaction students but not IDT students. Moallem (1998) researched the instructional design activities of teachers, not professional instructional designers. Both of these studies were not included in the final listing of articles. The professional instructional designer or IDT student term was not rigid and included professions that involved instructional design activities. A principle that guided this selection process was whether one of the prime responsibilities of a job involved designing and developing instruction. For instance, research studies involving distance educators and educational software developers were included, but research involving web graphic designers were not. In summary, 102 research studies were identified. While some pertinent studies may have been inadvertently overlooked and some included that could have been eliminated, the 102 identified studies are broadly representative of studies of ID practices and provide a substantial basis for this analysis.

Three Types of Studies of ID Practices

As illustrated in Table 2.1, there were three types of ID practices involved in these studies, namely (a) ID professional, (b) ID student, and (c) ID expert and novice differences. Guiding questions were identified within each of these focus areas, as well as specific questions that corresponded with each study (see Tables 2.2, 2.3 and 2.4). Each of the 102 studies initially were organized into three main categories which distinguished between an ID professional, an ID student and studies involving both ID experts and ID novices. A common theme or guiding question emerged within each of these three categories of studies. The five ID professional themes or guiding questions were: (a) common ID activities completed by ID professionals (i.e., *How do ID professionals design?*), (b) competencies required for ID professionals (i.e., *What competencies are required of ID professionals?*), (c) ID professionals' collaborative skills (i.e., *How do ID professionals collaborate?*), (d) ID professionals' internal processes, (i.e., *What are the internal processes of ID professionals?*), and (e) ID professionals' external roles (i.e., *What are the external roles of ID professionals?*). The three ID student themes or guiding questions were: (a) ID students' common ID activities (i.e., *How do ID students design?*), (b) effective ways to teach ID (i.e., *What are effective ways to teach ID?*), and (c) specific approaches to teach ID (i.e., *Can a particular intervention improve ID student learning?*). The two themes or guiding questions for the ten ID expert and novice differences research studies were: (a) expert and novice ID differences (i.e., *What are the differences between an expert instructional designer and a novice instructional designer?*), and, (b) ID novice development (i.e., *How do novices gain ID expertise?*).

Table 2.1 Three types of studies of ID practices and corresponding guiding questions

Focus	# of studies	% of studies
<i>ID professional</i>		
• How do ID professionals design?	32	30.8
• What competencies are required of ID professionals?	10	9.6
• How do ID professionals collaborate?	12	11.5
• What are the internal processes of ID professionals?	6	5.8
• What are the external roles of ID professionals?	7	6.7
<i>ID student</i>		
• How do ID students design?	7	6.7
• What are effective ways to teach ID?	9	8.7
• Can a particular intervention improve ID student learning?	11	10.6
<i>ID expert and novice differences</i>		
• What are the differences between an expert instructional designer and a novice instructional designer?	7	6.7
• How do novices gain ID expertise?	3	2.9

In this tally of 102 research studies, both Christensen and Osguthrope's (2004) and Ertmer et al.'s (2009) respective studies were counted twice. That is, Christensen and Osguthrope collected data on instructional designers' instructional strategies *and* what learning theories they based their ID work on. Ertmer and her colleagues also analyzed the differences on how expert and novice instructional designers interpreted case studies, as well as evaluated whether and to what extent an intervention (i.e., scaffolding guidelines) can facilitate novice instructional designers' understanding. A brief description of each area and guiding question, as well as, the corresponding study is found in the following sections. The number of participants is included in these tables. A more in-depth description of these findings is found in Chap. 3.

ID Professional

Characteristics of each specific ID professional study are found in Table 2.2. Each of these studies are organized by the five guiding questions and includes one or more specific questions that guided the particular study. Specific research methods or methods employed by a particular study and a description of a study's participants also are found in Table 2.2.

How Do ID Professionals Design?

Thirty-two of the studies (30.8 %) focused on current activities of professional instructional designers (see Table 2.1) Expanding upon Zemke's (1985)'s original

Table 2.2 Studies of ID practices involving ID professionals

Guiding question	Citation	Specific question(s)	Research method(s)	Participants
How do ID professionals design?	Allen (1996)	What are common ID activities of professional instructional designers?	Questionnaires	Professional instructional designers (n = 99)
	Calandra et al. (2008)	How do instructional designers incorporate audio into e-learning instruction?	Surveys	Professional instructional designers (n = 22)
	Cox and Osguthorpe (2003)	What are common ID activities of professional instructional designers?	Surveys	Of the total survey respondents (n = 142), there were 64 instructional designers (45 %) and 10 developers (7 %).
	Christensen and Osguthorpe (2004)	How do professional instructional designers use and implement instructional strategies?	Surveys	ID practitioners (n = 113)
	Ertmer et al. (2008)	How do ID professionals/experts solve ID problems?	Think-aloud protocols, surveys, and interviews	Experienced instructional designers with an average of 20.5 years of experience (n = 7)
	Ertmer et al. (2009b)	What are ID best practices?	Surveys and interviews	Professional instructional designers with an average of 23 years of experience (n = 16)
	Francis and Murphy (2008)	What are ID professionals' conceptualizations of learning objects?	Semi-structured interviews	Professional instructional (n = 10); "Seven had been instructional designers for 5 years or more while three had less than 5 years of experience" (p. 478)
	Holcomb et al. (1996)	How do instructional designers determine a successful project?	Interviews	Professional instructional designers with a least one year of experience (n = 40)
	Jin and Boling (2010)	How do ID professionals create visuals?	Surveys and content analysis	A professional instructional designer (n = 1) and undergraduate students (n = 29)
	Kennedy et al. (2014)	How do professional instructional designers perform evaluation activities, specifically Level 3 and Level 4 activities?	Surveys and interviews	Training professionals (n = 68)
	Kirschner et al. (2002)	How do ID professionals/experts solve ID problems?	Measurement scale and content analysis	Expert instructional designers (n = 15) composed of university designers (n = 9) and corporate training designers (n = 6)
		What are some ID best practices?		

(continued)

Table 2.2 (continued)

Guiding question	Citation	Specific question(s)	Research method(s)	Participants
	Klimczak and Wedman (1996)	What are success indicators of an ID project?	Content analysis and focus group interviews	Professional instructional designers (n = 6)
	Klimczak and Wedman (1997)	“What are the factors that contribute to ID project success?” (p. 75) How do professional instructional designers determine a successful project?	Focus group interviews and measurement scale	Focus group: “The [three] focus group interviews were comprised of four to eight stakeholders in the ID process (sponsors, trainers, learners)” (p. 77); Measurement scale: Professional instructional designers (n = 6) and focus group interview participants
	Le Maistre (1998)	How do professional instructional designers revise existing instructional materials?	Think-aloud protocols	Professional instructional designers (n = 8) with an average of 9.6 years of experience; Concentrated on two instructional designers
	Le Maistre and Weston (1996)	How do professional instructional designers revise existing instructional materials?	Think-aloud protocols	Professional instructional designers with an average of 9.6 years experience (n = 8)
	Liu et al. (2002)	What are common activities of professional instructional designers with regards to media production ? What are important skills required of instructional designers with regards to media production?	Interviews	Professional instructional designers (n = 11)
	Loughner and Moller (1998)	How do professional instructional designers implement task analysis procedures?	Questionnaires	Professional instructional designers (n = 164)
	Moller and Mallin (1996)	How do professional instructional designers perform evaluation activities?	Questionnaires	AECT and ISPI members (n = 191)
	Pieters and Bergman (1995)	What are common ID activities of professional instructional designers?	Questionnaires	Professional instructional designers (n = 35)
	Rowley (2005)	What are ID best practices?	Interviews and observations	“Expert instructional designers who had experience designing courseware” (p. 426) (n = 19)
	Rowland and DiVasto (2001)	How do ID professionals create powerful learning experiences?	Surveys and interviews	Survey “Authors, educators, and practitioners who were clearly recognized as authorities in the field” (n = 14); <i>Interview</i> Learners (n = 8)
	Roytek (2010)	How do instructional designers increase efficiency with regards to the ID processes?	Case study, content analysis, and interviews	Professional instructional designers with experience between 10 and 35 years (n = 11)
	Saroyan (1993)	How do professional instructional designers interpret evaluation activities?	Think-aloud protocols	Experienced instructional designers with a minimum of 10 years of experience (n = 3); Microbiology professors/SME’s with a minimum of 10 years of experience (n = 3)

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Table 2.2 (continued)

Guiding question	Citation	Specific question(s)	Research method(s)	Participants
What competencies are required of ID professionals?	Wedman and Tessmer (1993)	What are the common ID activities of professional instructional designers?	Surveys	Professional instructional designers with an average of approximately 6 years of experience (n = 73)
	Weston et al. (1997)	How do professional instructional designers revise existing instructional materials based upon formative evaluation sessions?	Think-aloud protocols	Professional instructional designers (n = 4)
	Williams van Rooij (2011)	How do instructional designers implement project management practices?	Surveys	“Respondents from public and private sector organizations that develop educational and training products” (n = 103)
	Williams et al. (2011)	How do professional instructional designers perform evaluation activities?	Interviews	Professional instructional designers with at least 8 years of experience (n = 7)
	Winer and Vazquez-Abad (1995)	What are the common ID activities of professional instructional designers?	Questionnaires	Professional instructional designers with at least 8 years of experience (n = 66)
	Visscher-Voerman and Gustafson (2004)	What are the common ID activities of professional instructional designers?	Interviews	Professional instructional designers who were highly recommended (n = 24)
	York and Ertmer (2011)	What are ID best practices?	Delphi study	Professional instructional designers with an average of 19.7 years experience (n = 31)
	York and Ertmer (2013)	What are ID best practices?	Surveys	Professional instructional designers with an average of 12 years of experience (n = 24)
	Zemke (1985)	What are the common ID activities of professional instructional designers?	Surveys	<i>Training’s</i> readership survey respondents
	Brill et al. (2006)	What project management competencies are required of ID professionals?	Delphi study	Professional instructional designers with 20 or more years of project management experience (n = 147)
	Klein and Jun (2014)	What competencies are required of ID professionals?	Surveys	Professional instructional designers (n = 82)
	Larson (2005)	What are essential skills of a professional ID graduate?	Surveys	Pre-1994 IDT graduates (n = 53); 1994–2003 IDT graduates (n = 95)
	Ritzhaupt et al. (2010)	What multimedia competencies are required of ID professionals?	Content analysis and surveys	<i>Content analysis</i> Analysis of IDT job advertisements (n = 205); <i>Surveys</i> IDT professionals (n = 231)

Analysis of IDT job advertisements (n = 205)

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Table 2.2 (continued)

Guiding question	Citation	Specific question(s)	Research method(s)	Participants
How do ID professionals collaborate?	Sugar et al. (2011)	What multimedia competencies are required of ID professionals?	Delphi study	Professional instructional designers (n = 11)
	Sugar et al. (2012)	What competencies are required of ID professionals?	Content analysis	Analysis of IDT job advertisements (n = 615)
	Thach and Murphy (1995)	What distance learning competencies are required of ID professionals?	Delphi study	Distance education experts (n = 103)
	Villachica et al. (2010)	What competencies are required of ID professionals?	Surveys	Professional instructional designers and HPT practitioners (n = 185)
	Williams van Rooij (2013)	What project management competencies are required of ID professionals?	Delphi study	Professional instructional designers with at least 8 years of experience (n = 8)
	Dicks and Ives (2008)	How do ID professionals collaborate with clients?	Interviews	Professional instructional designers with at least 2 years of experience (n = 8)
	Jo (2012)	How do ID professionals collaborate within a team?	Measurement scale	Professional instructional designers, graphic designers, programmers, and system engineers (n = 511)
	Johnson and Lee (2008)	How do ID professionals collaborate within a team?	Measurement scale	IDT graduate students (n = 20)
	Keppell (2001)	How do ID professionals collaborate with clients?	Case study	Professional instructional designer (n = 1)
	Macpherson and Smith (1998)	How do ID professionals collaborate with clients?	Surveys	“Academic authors who worked with instructional designers” (p. 124) (n = 54)
	Pan and Thompson (2009)	How do ID professionals collaborate with clients?	Interviews	Professional instructional designers (n = 7)
	Razak (2013)	How do ID professionals collaborate within a team?	Delphi study and interviews	<i>Delphi study:</i> Professional instructional designer, graphic designer and subject matter experts (n = 12); <i>Interviews:</i> Professional instructional designer, graphic designer and subject matter experts (n = 3)
	Rapanta et al. (2013)	How do ID professionals collaborate within a team?	Case studies and observations	eLearning design teams (n = 2)
	Schafer and Kim (2012)	How do ID professionals collaborate with clients?	Case study and content analysis	“A midsize suburban medical practice in the Midwest partnered with a private sector information technology provider and a university research team to develop the system for patients” (p. 9)

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Table 2.2 (continued)

Guiding question	Citation	Specific question(s)	Research method(s)	Participants
What are the internal processes of ID professionals?	Stewart and Waight (2008)	How do ID professionals collaborate within a team?	Case studies	eLearning teams (n = 4)
	Yusoff and Salim (2012)	How do ID professionals collaborate with subject-matter experts?	Content analysis	Professional instructional designers (n = 3) with an average of 5.5 years of experience
	Ziegenfuss and Lawler (2008)	How do ID professionals collaborate with clients?	Content analysis and observations	“An instructor and an instructional design specialist who collaborated on the design and implementation of a university course using a new course design process” (p. 151)
	Christensen and Osguthorpe (2004)	How do ID professionals use learning theories?	Surveys	ID practitioners (n = 113)
		How do professional instructional designers use and implement instructional strategies?		
	Honebein and Honebein (2014)	How do ID professionals evaluate the judge the usefulness of instructional methods for specific cognitive learning domains?	Measurement scale	Professional instructional designers, in-service K-12 teachers, individuals in related fields seeking a career change and full-time students (n = 57)
	Kanuka et al. (2013)	What are educational technologists’ teaching and technology philosophies?	Interviews	Professional educational technologists (n = 10)
	Sheehan and Johnson (2012)	What are the philosophical and methodological beliefs of ID professionals?	Measurement scale	ID faculty (n = 152); Professional instructional designers (n = 118)
	Thompson-Sellers and Calandra (2012)	How do ID professionals use learning theories?	Interviews	Professional instructional designers with an average of 10 years of experience (n = 3)
	Yanchar et al. (2010)	How do ID professionals use learning theories and other conceptual tools?	Interviews	Professional instructional designers (n = 7)
What are the external roles of ID professionals?	Campbell et al. (2006)	How do ID professionals “transform the culture of institutions through faculty-client relationships”?	Interviews and content analysis	Professional instructional designers (n = 4)
	Campbell et al. (2009)	What is the role of professional instructional designers within interpersonal, professional, institutional and societal levels?	Interviews	Professional instructional designers (n = 20)

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Table 2.2 (continued)

Guiding question	Citation	Specific question(s)	Research method(s)	Participants
	Lin (2007)	How do ID professionals deal with ethical issues?	Interviews	Professional instructional technologists with 10 years or less experience (n = 12); Professional instructional technologists with more than 10 years experience (n = 8)
	Perkins (2009)	How do ID professionals design within a particular context?	Case study	A case study involving the “development of Web-based classes for learners in Malawi” (p. 85)
	Schwier et al. (2004)	How do instructional designers describe their professional identities and their professional communities?	Interviews	Professional instructional designers with at least 3 years of experience (n = 5)
	Schwier and Wilson (2010)	What are the “unconventional roles” of professional instructional designers?	Focus group interviews and surveys	Focus group interview: Professional instructional designers (n = 6); Survey: Professional instructional designers (n = 16)
	Tracey and Unger (2012)	How do ID professionals design within a particular context?	Case study	Case study involving the “use of the constructivist ID model and instructional solution for a cross-cultural workforce” (p. 461)

survey of how ID professionals approach the “design, development, and delivery of training in their organizations” (p. 105), Wedman and Tessmer’s (1993) seminal study also inquired about common ID activities and models that are used in everyday practice. Subsequently, there were a few follow-up studies that asked similar questions about common ID activities and practices that occurred in the mid-1990s and early 2000s (e.g., Winer and Vazquez-Abad 1995). Allen (1996) sought to create a profile of professional instructional designers in Australia. Similarly, Cox and Osguthorpe (2003) examined how professional instructional designers spend their time during a typical workday.

Some of these studies concentrated on specific phases of the ID process, such as media production (Calandra et al. 2008), task analysis (Loughner and Moller 1998), project management skills (Williams van Rooij 2011) and how an instructional designer applied visual design principles (Jin and Boling 2010). Some studies focused on how professional instructional designers implemented evaluation activities. Moller and Mallin (1996) examined instructional designers’ current evaluation practices and more recently, Williams et al. (2011) researched how instructional designers used evaluation results to improve their products. Similarly, Le Maistre and her colleagues (Le Maistre and Weston 1996; Weston et al. 1997) examined how professional instructional designers revised their respective designs based on evaluation results.

A few studies went beyond the initial question with regard to common activities of an instructional designer and queried instructional designers about factors that contribute to a successful ID project (Holcomb et al. 1996; Klimczak and Wedman 1997). Roytek (2010) asked a similar question with regards to a project’s success and examined what professional designers “do to increase efficiency during the design of instruction” (p. 170). Other studies asked about ID decision-making. For instance, Ertmer et al. 2008 studied how experienced instructional designers solved ID problems. Studies of ID practices also have focused on understanding instructional design best practices and heuristics espoused by professional instructional designers and experts (e.g., Rowley 2005; York and Ertmer 2011, 2013).

What Competencies Are Required of ID Professionals?

More recently, efforts in defining competencies required of IDT professionals have taken place. Villachica et al. (2010) surveyed employers about the skills that they are expecting from entry-level instructional designers. Sugar et al. (2012) examined job advertisements and classified key skills required for successful job candidates within various job settings. Specific aspects of an instructional designers’ competencies also were researched, such as multimedia competencies (Ritzhaupt et al. 2010; Sugar et al. 2011) and project management competencies (Brill et al. 2006; Williams van Rooij 2013). Thach and Murphy (1995) also identified key distance education roles and competencies in the mid-1990s.

How Do ID Professionals Collaborate?

Starting with two case studies in the late 1990s and early 2000s (Keppell 2001; Macpherson and Smith 1998), an emphasis on ID professionals collaboration skills also has become a current topic of interest. Several studies have examined how ID professionals collaborate with clients (e.g., Schafer and Kim 2012) and with subject-matter experts (Yusoff and Salim 2012). Similarly, researchers have studied how ID professionals collaborated on a design team (e.g., Johnson and Lee 2008; Razak 2013).

What Are the Internal Processes of an ID Professional?

Besides considering common instructional design practices, instructional designer competencies, and collaborative skills, attempts to understand instructional designers' internal or rather thinking processes have taken place. Christensen and Osguthorpe (2004) surveyed ID professionals on how they make design decisions based on specific learning theories. More recently, specific studies queried how instructional designers employ learning theories and conceptual tools (Thompson-Sellers and Calandra 2012; Yanchar et al. 2010). In addition, research on ID professionals' philosophical and methodological beliefs (Sheehan and Johnson 2012) has been conducted.

What Are the External Roles of an ID Professional?

The role of an ID professional in a variety of settings and situations has been explored. Both Perkins (2009) and Tracey and Unger (2012) reported case studies on conducting instructional designer activities within a different cultural context. Ethical issues that ID professionals face in their respective work setting (Lin 2007) and professional instructional designers' unconventional roles (Schwier and Wilson 2010) also have been considered. Richard Schwier and his colleagues have focused on understanding the role and identities of professional instructional designers (Schwier et al. 2004) and their impact on stakeholders through a systemic perspective (Campbell et al. 2006, 2009).

ID Student

A summary of the twenty-seven ID student studies are found in Table 2.3. Each of these studies are organized by three ID student guiding questions and includes one or more specific questions associated with a particular study.

Table 2.3 Studies ID practices involving ID students

Guiding question	Citation	Specific question(s)	Research method(s)	Participants
How do ID students design?	Cates (1994)	What are novice instructional designers current <i>production</i> practices in developing a five-lesson instructional module?	Content analysis	IDT graduate students (n = 11)
	Kerr (1983)	How do ID students make instructional design decisions?	Interviews	IDT graduate students (n = 26)
	Magliaro and Shambaugh (2006)	How do ID students' mental model of the ADDIE model influence their respective instructional designs?	Content analysis	IDT graduate students (n = 178)
	Sugar (2001)	How do ID students interpret usability sessions?	Interviews, content analysis, and think-aloud protocols	IDT graduate students (n = 11)
	Verstegen et al. (2006)	How do novice instructional designers respond to specific design iterations?	Case study and questionnaires	Novice instructional designers (n = 8)
	West and Hannafin (2011)	How do novice instructional designers' activities fit within a Community of Innovation framework?	Interviews	IDT graduate students (n = 4)
	Yusop and Correia (in press)	What are novice designers' ID practices when using a Civic-Minded Instructional Designers (CMID) framework?	Interviews, observations and content analysis	IDT graduate students (n = 4)
	Boling et al. (2011)	What is the role of ADDIE?	Content analysis	"Instructors and practitioners of ID" (p. 34) (n = 16)
	Brown (2004)	What are effective ways to teach <i>multimedia production</i> skills to ID students?	Interviews and observations	IDT students (n = 3); IDT instructors (n = 2)
	Chen et al. (2012)	What are effective ways to teach <i>formative evaluation</i> skills to ID students?	Case studies and surveys	Study #1: IDT graduate students (n = 20); Study #2: IDT graduate students (n = 15)
What are effective ways to teach ID?	Dabbagh and Blijd (2010)	What are the effects of participating in a real-world project on ID student learning?	Interviews	IDT graduate students (n = 11)
	Johari and Bradshaw (2008)	What is the effect of a project-based instructional technology internship program on ID student learning?	Interviews, observations, and content analysis	IDT student case studies (n = 4)
	Larson and Lockee (2009)	How does an exemplary IDT program meet the needs of its students?	Case study and interviews	IDT faculty members (n = 17); IDT alumni (n = 5); IDT students interview (n = 13)
	Quinn (1994)	What are the effects of participating in a real-world project on ID student learning?	Case study, questionnaires, and content analysis.	IDT graduate students (n = 9)
	Woolf and Quinn (2001)	What is the effect of a peer review process on ID student learning?	Interviews	Students in an "introduction to the principles and procedures of ID" course (p. 22) (n = 15)
	Woolf and Quinn (2009)	What is the effect of participating in a real-world project on ID student learning?	Interviews	Novice instructional designers (n = 7)

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Table 2.3 (continued)

Guiding question	Citation	Specific question(s)	Research method(s)	Participants
Can a particular intervention improve ID student learning?	Bennett (2010)	Can case studies impact IDT student learning?	Interviews, observations, and content analysis	IDT graduate students (n = 12)
	Ertmer et al. (2009)	Can specific coaching and problem-solving strategies improve ID student learning?	Surveys and content analysis	Novice instructional designers with no more than 3 years of experience and completed one or less postgraduate ID course (n = 24); Experienced instructional designers with a minimum of 8 years of experience and completed one or more postgraduate ID courses (n = 8); Control group included 8 experts and 11 novices and Treatment group included 13 novices.
	Dabbagh and Denisar (2005)	Can a web-based heterarchical organization improve ID students' problem solving skills?	Content analysis and questionnaires	IDT graduate students (n = 14)
	Dabbagh et al. (2006)	Can problem-based learning strategies improve ID student learning?	Case study and content analysis	IDT graduate students (n = 11)
	Ge et al. (2005)	Can question prompts improve ID student learning?	Think-aloud protocols	IDT graduate students (n = 8)
	Julian et al. (2000)	Can case studies impact IDT student learning?	Surveys and interviews	IDT graduate students (n = 42)
	Kollmann and Hardré (2013)	Can instructional learning aids improve ID student learning?	Questionnaires, observations and content analysis	IDT graduate students (n = 11)
	Sharma and Hannafin (2004)	Can scaffolding improve ID students' critical thinking skills?	Interviews and content analysis	IDT graduate students "purposefully selected from 17 students enrolled in an online ID class" (p. 189) (n = 5)
	Stepich et al. (2001)	Can specific coaching and problem-solving strategies improve ID student learning?	Content analysis	IDT students (n = 37)
	Sugar (in press)	Can case studies impact IDT student learning?	Surveys	IDT students (n = 72)
Can specific coaching and problem-solving strategies improve ID student learning?	Versteegen et al. (2008)	Can specific coaching and problem-solving strategies improve ID student learning?	Questionnaires and content analysis	Study #1: Educational Sciences students (n = 10); Study #2: Educational Sciences students (n = 8)

Each study's research methods and a description of a study's participants also are found in Table 2.3.

How Do ID Students Design?

Similar to studies on ID professionals' current instructional design activities, there have been inquiries on how ID students implement instructional design activities. Kerr's (1983) original study in the 1980s investigated how students make ID decisions. Magliaro and Shambaugh (2006) researched the composition of ID students' respective mental model of the ADDIE model and how this conception influence their respective instructional designs. Other ID students studies concentrated on students' production practices (Cates 1994), how students' activities fit within a Community of Innovations framework (West and Hannafin 2011), how students' activities fit within a Civic-Minded Instructional Designers framework (Yusop and Correia 2012; Yusop and Correia in press), how students interpreted usability sessions (Sugar 2001) and how students respond to specific design iterations (Verstegen et al. 2006).

What Are Effective Ways to Teach ID?

A majority of the ID student studies concentrated on determining effective ways to teach ID to students. A few studies (Dabbagh and Blijd 2010; Quinn 1994; Woolf and Quinn 2009) assessed the effects of completing a real-world project and its impact on ID student learning. Similarly, Johari and Bradshaw (2008) investigated the impact of a project-based instructional technology internship program. Some ID student studies considered the influence of specific instructional strategies, such as a peer review process (Woolf and Quinn 2001), and ID case studies (e.g., Julian et al. 2000). Specific phases of the ID process also have been explored, such as multimedia production skills (Brown 2004) and formative evaluation skills (Chen et al. 2012).

Can a Particular Intervention Improve ID Student Learning?

Besides exploring optimal ways to teach ID to students, some studies queried whether a particular intervention can improve student learning. Implementation of specific coaching and problem-solving strategies have been examined in a few studies (Ertmer et al. 2009; Stepich et al. 2001; Verstegen et al. 2008). Kollmann and Hardré (2013) recently questioned whether specific instructional learning aids can improve ID student learning. More detailed analyses focused on certain student interactions, such as question prompts (Ge et al. 2005), scaffolding ID

students' critical thinking skills (Sharma and Hannafin 2004), using problem-based learning strategies in teaching ID (Dabbagh et al. 2000), and how students solved ID problems in a web-based hypermedia setting (Dabbagh and Denisar 2005).

ID Expert and Novice Differences

This set of studies compared and contrasted the differences between an expert (or experienced) instructional designer and a novice (or student) instructional designer. Characteristics of each of these studies including one or more specific questions, research methods used by a study, and a description of a study's participants also are found in Table 2.4. This is a combination or intersection of the *ID professional* and *ID student* types of studies. For the *What are the differences between an expert instructional designer and a novice instructional designer?* studies, Rowland (1992) originally explored the differences between how an expert ID and novice ID design instruction. Subsequently, a similar question on the differences between how ID experts and ID students solve ID problems took place (Perez and Emery 1995; Perez et al. 1995). Recently, Ertmer et al. 2009 and Fortney and Yamagata-Lynch (2013) also examined this difference. Certain aspects of ID expert and novice differences also were investigated with regards to the development of a instructional software product (Boot et al. 2007) and the use of an automated instructional design tool (Uduma and Morrison (2007). Three studies also analyzed how ID students developed ID expertise (Ge and Hardré 2010; Hardré et al. 2006; Hardré and Kollmann 2013).

Analyzing Studies of ID Practices

With the goal of comprehending the impact of these research studies, these ID practices studies were analyzed by the following four approaches, namely (a) Google Scholar citations, (b) publication year, (c) research methods, and (d) journals.

The top 25 cited studies of ID practices are displayed in Table 2.5. These articles were cited by other articles 29 times or more. The top four studies were cited more than 100 times. Even though they were not the earliest studies on ID practices, Rowland's (1992) (230 citations), Visscher-Voerman and Gustafson's (2004) (127 citations), and Wedman and Tessmer's (1993) respective studies (118 citations) clearly are the most cited and influential studies on ID professionals. Thach and Murphy's (1995) study (252 citations) on the roles and competencies of distance education professionals was timely since distance education boomed at the advent of web pages and online instruction in the mid-1990s. The most cited research studies on ID students are Ge et al. (2005) study (61 citations) and Stepich et al.'s (2001) study (54 citations), ranked tenth and eleventh respectively.

Table 2.4 Studies of ID practices involving ID expert-novice differences

Guiding question	Citation	Specific question	Research method(s)	Participants
What are the differences between expert and novice instructional designers?	Boot et al. (2007)	What are the differences in how an expert ID and a novice ID develop an instructional software product?	Questionnaires and content analysis	Educational developers (n = 14) which included novice developers with an average of .5 years of experience (n = 6) and experienced developers with an average of 6 years of experience (n = 8).
	Ertmer et al. (2009)	How do experts and novices solve ID problems?	Surveys and content analysis	Novice instructional designers with no more than 3 years of experience and completed one or less postgraduate instructional design course (n = 24); Experienced instructional designers with a minimum of 8 years of experience and completed one or more postgraduate ID courses (n = 8) Control group included 8 experts and 11 novices; Treatment group included 13 novices
	Fortney and Yamagata-Lynch (2013)	How do experts and novices solve ID problems?	Surveys, observations, interviews, and content analysis	Professional instructional designers (n = 8); more than 5 years of ID experience (n = 5) and less than 2 years of ID experience (n = 3); "Secondary participants were managers, instructional designers who worked with the primary participants, and internal clients who were engaged in problem-solving activity with the primary participants." (p. 96) (n = 20)
	Perez and Emery (1995)	How do experts and novices solve ID problems?	Think-aloud protocols	Novice instructional designers (n = 4); Experienced instructional designers with a minimum of 10 years of experience (n = 5)
	Perez et al. (1995)	How do experts and novices solve ID problems?	Think-aloud protocols	Novice instructional designers with no more than 2 years of experience (n = 4); Experienced instructional designers with a minimum of 10 years of experience (n = 5)
	Rowland (1992)	What are the differences in how an expert instructional designer and a novice instructional designer design instruction?	Think-aloud protocols	Professional instructional designers with at least 7 years of experience (n = 4); IDT graduate students (n = 4)
	Uduma and Morrison (2007)	What are the differences in how an expert ID and a novice ID use an automated ID tool?	Think-aloud protocols, questionnaires, and content analysis	Non-designers with no formal training and actual experience (n = 4), novice designers with formal training, but no actual experience (n = 4), and expert designers with a minimum of 2 years of experience (n = 4)

(continued)

Table 2.4 (continued)

Guiding question	Citation	Specific question	Research method(s)	Participants
How do novices gain ID expertise?	Ge and Hardré 2010	How do ID students gain expertise from peer interaction and from a cognitive apprenticeship model?	Observations, interviews, and content analysis	IDT graduate students (n = 11); Two cohorts (n = 6 and n = 5)
	Hardré et al. (2006)	How do students perceive of the ID process?	Interviews, observations, content analysis and, measurement scale	Novice instructional designers (n = 7)
	Hardré and Kollmann (2013)	How do students' perceptions and backgrounds and ID course materials influence their ID expertise development?	Interviews, observations, content analysis, and questionnaires	IDT graduate students (n = 17; n = 11)

Table 2.5 Top 25 studies of ID practices ranked by google scholar citations

Rank	Title	Google scholar citations
1	Thach and Murphy (1995)	251
2	Rowland (1992)	230
3	Visscher-Voerman and Gustafson (2004)	127
4	Wedman and Tessmer (1993)	118
5	Brill et al. (2006)	78
6	Cox and Osguthorpe (2003)	68
6	Perez and Emery (1995)	68
8	Schwier et al. (2004)	66
8	Kirschner et al. (2002)	66
10	Ge et al. (2005)	61
11	Stepich et al. (2001)	54
12	Liu et al. (2002)	49
12	Perez et al. (1995)	49
14	Christensen and Osguthorpe (2004)	44
15	Dabbagh et al. (2000)	42
16	Le Maistre (1998)	41
16	Winer and Vazquez-Abad (1995)	41
18	Campbell et al. (2009)	36
18	Kerr (1983)	36
18	Larson and Lockee (2009)	36
21	Pieters and Bergman (1995)	35
22	Ertmer et al. (2008)	32
23	Quinn (1994)	31
23	Zemke (1985)	31
25	Lin (2007)	29
25	Sharma and Hannafin (2004)	29

As shown in Fig. 2.1, 78 % of the studies ($n = 80$) have been published during the past 14 years and 36 % of the studies ($n = 37$) have been published during the past 4 years. Only 21.5 % of the studies ($n = 22$) were published prior to 2000. However, three of the top four articles who had the most Google Scholar citations were published prior to 2000 (i.e., Rowland 1992; Thach and Murphy 1995; Wedman and Tessmer 1993). The first two studies were published in 1983 and 1985 respectively (Kerr 1983; Zemke 1985).

There are also particular trends with the types of articles, as well (see Figs. 2.2, 2.3 and 2.4). More than forty percent of the *How do ID professionals design?* articles ($n = 14$; 43.7 %) were published between 1985 and 1999 (see Fig. 2.2). Only two other types of articles were published during the same time period: MacPherson and Smith's (1998) research on how a university instructional designer collaborated with faculty members and Thach and Murphy's (1995) study on distance educators' competencies and roles. The more recent *How do ID professionals design?* studies focused on particular aspects of the ID process, such as Jin and Boling's (2010) study on visual design practices and Williams van

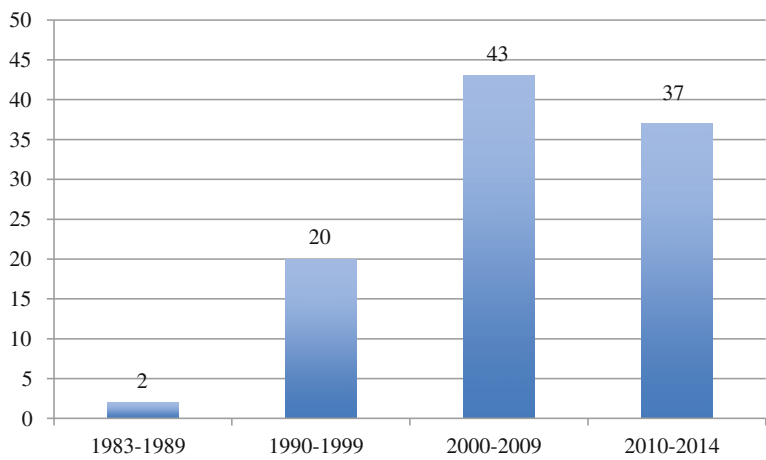


Fig. 2.1 Number of studies of ID practices published between 1983 and 2014

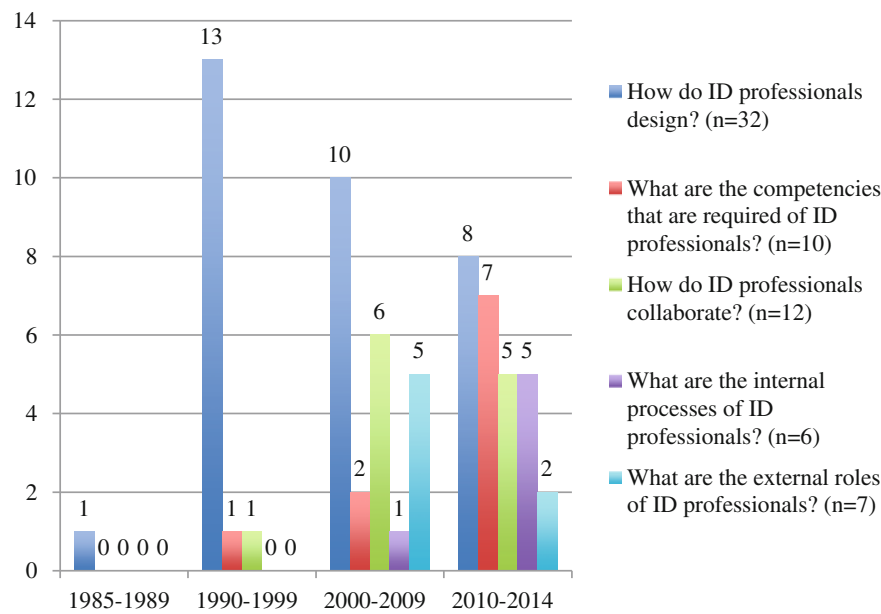


Fig. 2.2 Number of ID Professional studies published between 1985 and 2014

Rooij’s (2011) research on project management, as well as, overall ID best practices (e.g., York and Ertmer 2011). As illustrated in Fig. 2.2, a majority (70 %; n = 7) of the *What are the competencies that are required of ID professionals?* studies were published during the past 4 years. A majority of the *How do ID*

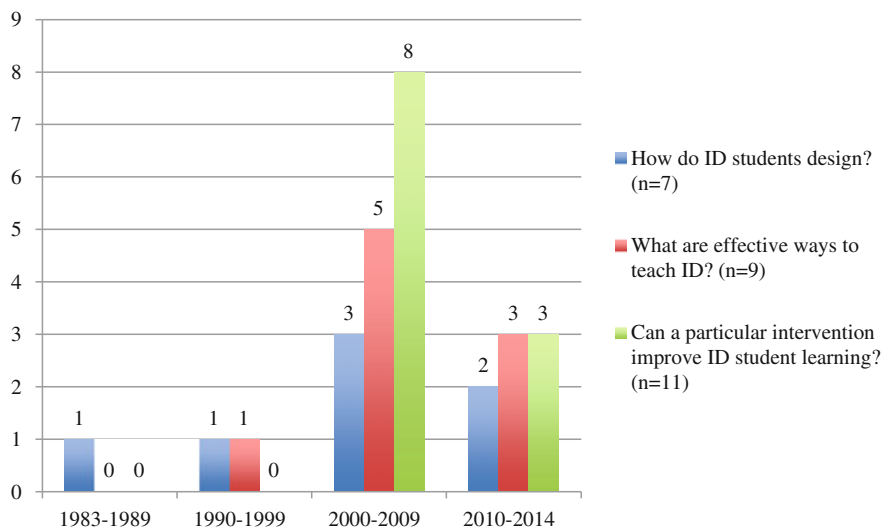


Fig. 2.3 Number of ID Student studies published between 1983 and 2014

professionals collaborate? (92 %; $n = 11$), all of the *What are the internal processes of ID professionals?* ($n = 4$) and *What are the external roles of ID professionals?* studies ($n = 8$) were published during the past 14 years.

The publication year of each ID student studies is illustrated in Fig. 2.3. More than seventy percent of the *How do ID students design?* studies ($n = 5$) were published between 1983 and 2006. More recent ID student practices studies have focused on the best ways to teach ID students; 89 % of these studies ($n = 8$) were published during the past 14 years (see Fig. 2.3). These studies also have emphasized on evaluating whether a particular intervention can improve ID student learning; all of these studies ($n = 11$) have been conducted during the past 14 years.

The ten expert-novice ID differences studies were published between 1992 and 2013 (see Fig. 2.4). More than seventy percent (71 %; $n = 5$) of the *What are the differences between an expert instructional designer and a novice instructional designer?* studies were published prior to 2008. All of the *How do novices gain ID expertise?* studies ($n = 3$) were published between 2005 and 2013.

As illustrated in Table 2.6 and Fig. 2.5, the top four research methods were fairly distributed among the one hundred and two studies. Approximately 40 % of the studies ($n = 41$; 40.2 %) employed interviews (this also includes the three studies that used focus group interviews) and more than thirty percent of the studies ($n = 31$; 30.4 %) used content analysis as a research method. Twenty-three studies used surveys and thirteen studies used questionnaires; when combined, approximately 34 % of the studies of ID practices ($n = 36$; 34.5 %) either used surveys or questionnaires as a data collection method. Some earlier studies ($n = 11$; 11.3 %) conducted think-aloud protocols in order to analyzed their

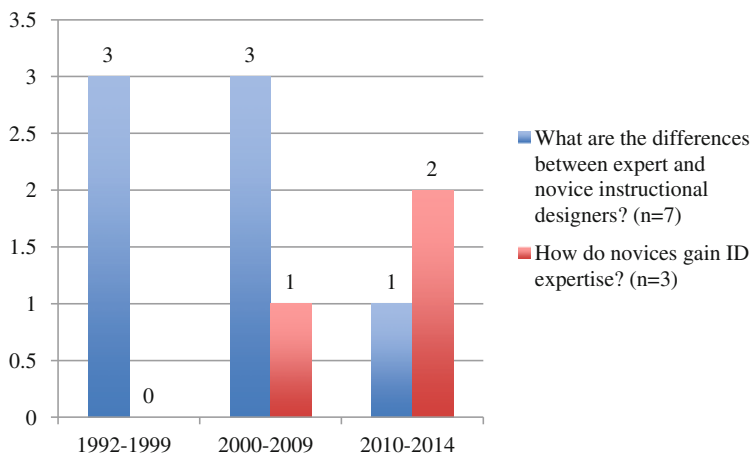
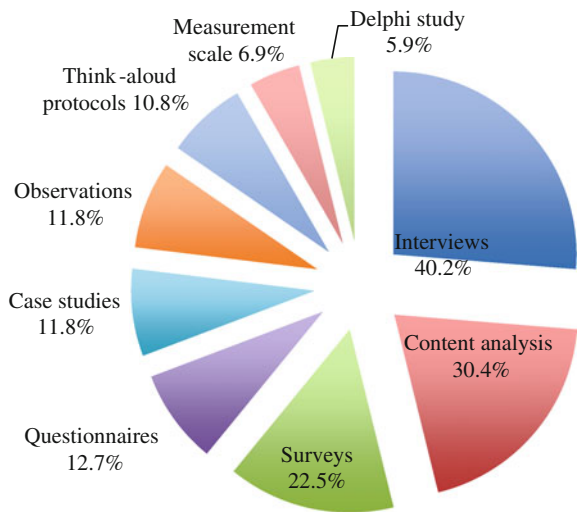


Fig. 2.4 Number of ID expert-novice differences studies published between 1992 and 2014

Table 2.6 Research methods completed in studies of ID practices

Research method	<i>f</i>	Percentage
Interviews	41	40.2
Content analysis	31	30.4
Surveys	23	22.5
Questionnaires	13	12.7
Case studies	12	11.8
Observations	12	11.8
Think-aloud protocols	11	10.8
Measurement scale	7	6.9
Delphi study	6	5.9

Fig. 2.5 Percentage of research methods completed in studies of ID practices



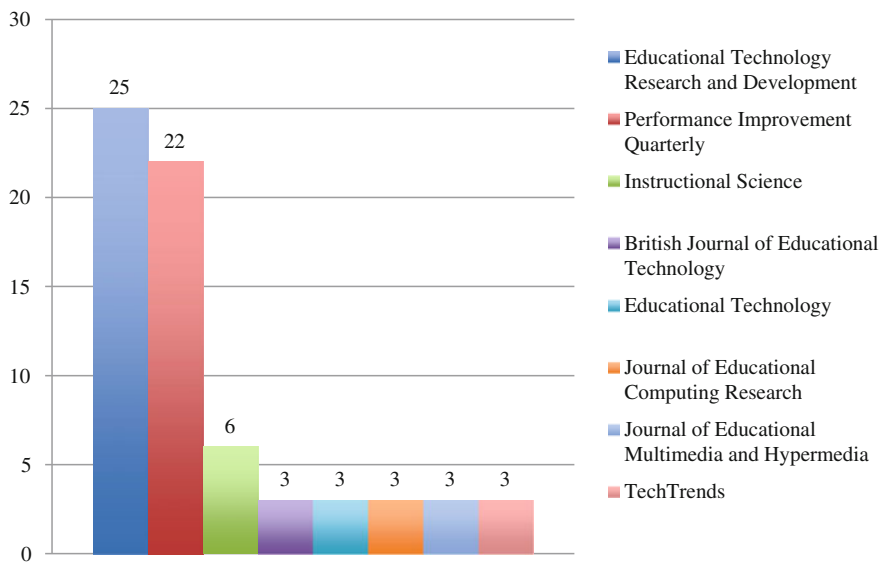


Fig. 2.6 Number of journals that published studies of ID practices

respondents’ thinking (e.g., Rowland 1992; Sugar 2001). More recent studies (n = 6; 6.2 %) sought information from Delphi panelists (e.g., Williams van Rooij 2013; York and Ertmer 2011). Some studies did not provide specific information about their respondents. For instance, with the goal of understanding how ID professionals collaborate with their clients, Schafer and Kim (2012) conducted a case study and analyzed content from “a midsized suburban medical practice in the Midwest partnered with a private sector information technology provider and a university research team to develop the system for patients” (p. 9). Zemke (1985) surveyed *Training’s* Readership Survey respondents, but did not include a specific amount. A majority of the content analysis studies analyzed existing data collected from their respective respondents. However, there were two exceptions. Ritzhaupt et al. (2010) analyzed 231 job ads and Sugar et al. (2012) analyzed 615 job ads.

The one hundred and two studies of ID practices were published in thirty-three journals. *Educational Technology Research and Development* (25.8 %; n = 25) and *Performance Improvement Quarterly* (22.7 %; n = 22) were the top two journals (see Fig. 2.6). When combined, these two journals accounted for 48.5 % of these studies of ID practices. Six studies (6.2 %) were published in *Instructional Science*; three studies (3.1 %) were published in the four following journals (a) *British Journal of Educational Technology*, (b) *Educational Technology*, (c) *Journal of Educational Computing Research*, and (d) *Journal of Educational Multimedia and Hypermedia*.

Summary

This chapter described and analyzed one hundred and two studies of ID practices. There were three main categories of these studies namely: (a) ID professional, (b) ID student, and (c) Expert and novice ID differences. Each group of studies was delineated by specific guiding questions. Given the recent increase of studies of ID practices, it is no doubt these studies are trending upwards (see Fig. 2.1). Each of the studies is described and organized by a specific guiding question in Chap. 3.

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