

Competencies and Standards for Instructional Design and Educational Technology

On behalf of the International Board of Standards for Training, Performance and Instruction

J. Michael Spector, Florida State University
James D. Klein, Arizona State University
Robert A. Reiser, Florida State University
Roderick C. Sims, Knowledgecraft, Australia
Barbara L. Grabowski, Penn State University
Ileana de la Teja, University of Quebec at Montreal

Discussion Paper for ITFORUM, April 17-21, 2006

Abstract

The International Board of Standards for Training, Performance and Instruction (*ibstpi*) has developed and validated competencies for professional practitioners in the areas of instruction, instructional design, and training management and is currently engaged in projects to create similar sets of competencies for program evaluation and online learning (see <http://www.ibstpi.org>). These sets of competencies have been adopted by professionals and professional organizations as well as by academic institutions and used to improve training and practice in areas related to instructional design and technology (broadly conceived). As *ibstpi* directors and advisors, we have become aware of issues pertaining to professional standards and have struggled with their creation, validation, use and influence on professional practitioners. In this paper and the ensuing discussion, it is our intent to identify and discuss a number of these issues. It is not our intent to limit the discussion to *ibstpi* standards, nor to promote *ibstpi* standards over others. The discussion will include *ibstpi* and related standards, competencies and other efforts intended to define, promote and advance instructional design and educational technology.

Keywords: Competency; Competency model; Educational technology; Instructional design; Performance statements; Standards

Competencies and Standards for Instructional Design and Educational Technology

Introduction

A meeting was hosted by the Educational Information Science Research and Technology Program at the University of Bergen in 1999 concerning the integration of technology into learning and performance (Spector & Anderson, 2000). One of the recurring points of discussion concerned how to better prepare people to think and perform well in complex problem solving domains such as engineering design, environmental planning and medical diagnosis. Questions about assessing competence arose within that context. David Jonassen said that people do not generally see themselves as collections of competencies. There were two kinds of rejoinders: (a) employees or potential employees are often hired and judged in terms of having or not having certain competencies; and, (b) some people do see themselves in terms of competencies, especially with regard to feelings of exceptional mastery or of embarrassing incompetence with regard to a particular skill. So, what are competencies? What is their potential relevance and use for professional practitioners in instructional design and educational technology?

We recognize that there is some tension within the educational community with regard to competencies. Many who are critical of competency-based approaches associate them with a narrow and reductionist view of learning and instruction (Chappell, 1996; Hyland, 1996). This is perhaps a result of early task and job analysis methods that were appropriate for and emphasized discrete, well-defined tasks. Such tasks are relatively easy to assess and may occur in settings outside the classroom. However, many real world tasks are not so well-defined and are perhaps better characterized as *wicked* in the sense that they have ill-defined aspects and are subject to multiple acceptable solution approaches (Rittel & Webber, 1973). In addition, many real world problems are *wild* in the sense that they often involve multiple agents and contain dynamic and time-critical aspects that may well change as a solution is being developed (Klein, Orsanu, Calderwood, & Zsombok, 1993). Wild and wicked problems are pervasive. Analysis of associated problem solving tasks is not simple; traditional approaches to task analysis often miss critical aspects or fail to account for problem dynamics and changing circumstances. How to support skill development and judge competency for such tasks are critical areas of ongoing investigation. Design tasks have many aspects of such wild and wicked problems. As a consequence, it is fair to recognize at the outset the limitations of traditional methods used to define the competencies underlying what instructional designers do in analyzing tasks, supporting skill acquisition and knowledge development, assessing knowledge and performance, and evaluating programs.

More recent task analysis and competency development methods adopt a naturalistic perspective that explicitly recognizes the interrelated nature of tasks, encouraging a holistic view of complex problem situations (Krems, 1995; Spector & Anderson, 2000; Spiro, Feltovich, Jacobson, & Coulson, 1991). Regardless of the limitations of effectively supporting skill development and competency assessment for complex tasks, it is clear that organizations all over the world expect employees to be able

to develop and demonstrate competence in many challenging task areas, ranging from dentistry and medical diagnosis to instructional design (Arguelles & Gonczi, 2000; Fletcher, 1997; Leung, 2002; Marchese, 1994; Stolovich, Keeps, & Rodrigue, 1999; Voorhees, 2001).

We proceed on the belief that competencies often do and rightfully should have a place in many work and learning contexts, including instructional design and educational technology realms. We provide a brief discussion of the rationale for competencies, although it is not our purpose to defend the general applicability of a competency-based approach to learning and instruction. Our focus is primarily on the notion of competencies with regard to adults who are planning to pursue careers in instructional design, educational technology and related fields.

Along the way, we will discuss how the International Board of Standards for Training, Performance and Instruction (*ibstpi*) views and develops competencies. Other perspectives on competency that pertain to instructional designers and educational technologists will also be presented, including the IEEE Learning Technology Technical Committee's work in progress on curriculum standards for undergraduate, graduate and postgraduate education in educational technology (see <http://lttf.ieee.org/>). One need not accept all or any of these views on instructional design and educational technology competencies, but professionals interested in these areas ought to at least be aware that these views exist and that they have had and may continue to have significant impact on the profession.

Definitions

The language of competence is pervasive. We often judge ourselves and others as being more or less competent with regard to certain skills: (a) *So-and-so ought to be thrown in jail for incompetence on account of how that situation was managed*; (b) *The way that person responded to the judiciary committee was a model of competence – clear, concise replies with specific examples and citations of precedence*; (c) *I am a complete klutz when it comes to dancing*. There are many such examples of explicit or implied references to the notion of *competence*. Not surprisingly, the ordinary language of competence is generally consistent with a dictionary definition of competence as a state of being adequately or sufficiently qualified to perform a task that is reasonably well defined (see, for example, the definitions of competency at <http://dictionary.oed.com/entrance.dtl> or at <http://www.m-w.com/dictionary.htm>).

The International Board of Standards for Training, Performance and Instruction defines a competency as “an integrated set of skills, knowledge, and attitudes that enables one to effectively perform the activities of a given occupation or function to the standards expected” (see <http://www.ibstpi.org>; see also Richey et al., 2001). This definition is presented by *ibstpi* in the context of competencies for adults working as professionals in the training and performance sector as evaluators, instructional designers, instructors, and training managers.

Discussion

Competency development

Figure 1 shows the approach that *ibstpi* has followed to develop and validate competencies (Klein & Richey, 2005). Competency development represents a large-scale research and development project requiring several years to complete. Furthermore, many individuals and organizations participate in the process. Each recent project has involved work by a research team comprised of several *ibstpi* directors, participation of the entire Board, and the input of hundreds of professional practitioners and scholars throughout the world.

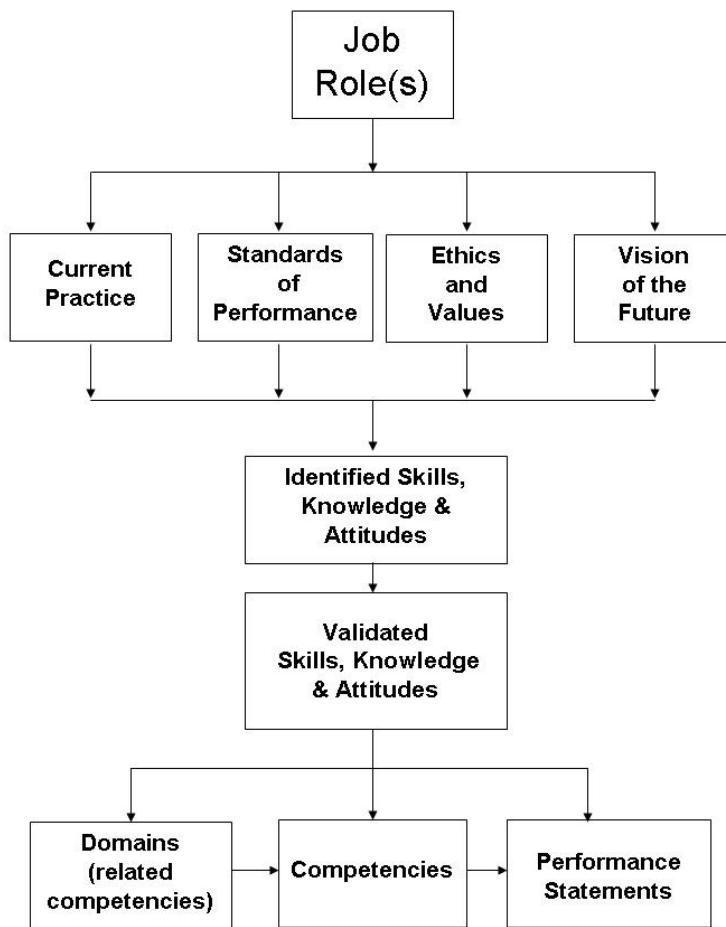


Figure 1. The *ibstpi* competency development model.

Competency development involves identifying the knowledge, skills, attitudes, capabilities, and tasks associated with a particular job role such as instructional designer. Once a job role is defined, current practices and existing standards are identified to facilitate competency development. Furthermore, the ethics and values commonly used to

evaluate job-related behaviors must also be determined. Finally, a vision of the evolving nature and the future of the job role is articulated. This vision typically involves an analysis of emerging trends and interpretations of current research, including social, cultural and economic pressures. Current practice, existing standards, ethics, values, and a vision of the future collectively provide the major input into the identification and validation of the knowledge, skills and attitudes believed to be critical to effective performance in a particular job role.

The *ibstpi* competency model consists of three main components – domains, competencies, and more specific performance statements associated with each competency. A domain is a grouping of related competencies. Each domain categorizes a group of competencies into an area of activity and identifies a theme for that group. For example, one domain in the *ibstpi* instructional design competencies is *Planning and Analysis* (see Appendix A). Competency statements are the fundamental components of the *ibstpi* model. Each one is a short, general description of a complex effort. One example for instructional design is “Evaluate and assess instruction and its impact.” Demonstration of a particular competency consists of several specific performances. *Ibstpi* uses performance statements to elaborate what is involved when a professional exhibits a particular competency. For example, the designer competency for evaluation and assessment is partially supported by the performance statements, “Construct valid and reliable test items using a variety of formats” and “Develop and implement formative evaluation plans.” Performance statements are not intended to indicate how to perform a task or steps in a specific procedure; rather, they are intended to reflect how one would recognize competent performance. Competencies and performance statements are structurally the same, differing only in the level of detail and specificity.

The model shown in Figure 1 represents the general flow in the *ibstpi* competency development process. In actual operation, there are five major phases: (1) Identification and Review of Foundational Research; (2) Competency Drafting; (3) Competency Validation; (4) Revision and Rewriting; and, (5) Publication and Dissemination.

The *ibstpi* competencies are based upon research foundations, which vary depending on the particular job and tasks involved. This research usually consists of reviews of existing competencies in use by various professional associations and organizations around the world, research on skill development in a particular area and research that reports lessons learned and best practices with regard to specific and innovative approaches to a job or skill. In the case of competency updates, the original set of competencies (which was rooted in a research base as well) serves as a starting point. This research foundation serves as the first step in establishing the breadth and content for a preliminary set of standards. Basic premises and tentative assumptions are then articulated and agreed upon. Finally, an initial list of competencies is drafted using all of these sources of information. This draft list of competencies serves as the starting point for further content validation based on current practice, blended with a vision of the future.

The *ibstpi* board of directors serves as an expert focus group that analyzes and debates the initial list. Competencies and performance statements are rewritten by persons with particular expertise in a given area. The new list is analyzed, debated, and rewritten several times to reflect the evolving input and to establish format consistency.

Once a list is established that has board approval, the formal competency validation process begins. Typically, this is a survey research effort to establish the extent to which each competency and performance statement is clearly stated and representative of a critical job-related function, task or activity. These instruments are administered to a volunteer sample of several hundred practitioners and scholars in diverse geographical locations and work environments.

The final competency list is then modified to reflect the survey data and the input of the validation group. Competencies or performance statements without a high degree of support are typically removed, and new statements are added that have been generated and supported substantially. Many preliminary statements are discovered to be ambiguous or misleading and are rewritten and reformulated based on the survey data. If respondents offer conflicting opinions, the Board makes the ultimate decision based upon its collective experience and vision. Ultimately, the board approves a final set of competency standards.

The aforementioned methods of competency identification and validation have been used very successfully by *ibstpi*. Over the years, *ibstpi* has integrated interviews and focus groups with experienced practitioners into the process. Many who develop competencies also include direct observations of people performing tasks. Prior to engaging in an effort to update existing competency lists, the *ibstpi* board plans to closely examine these and other methods of competency identification and validation. It is likely that the *ibstpi* competency development model will evolve as a result. One of the primary purposes of conducting this online discussion is in fact to gather input regarding effective (and ineffective!) methods of identifying and validating competencies in our field. We welcome and encourage comments and feedback with regard to our notion of the complex (wild and wicked) nature of instructional design and our competency development model, because it is the Board's intent to be responsive and responsible in fulfilling its primary mission of competency development.

The ibstpi competencies for instructional designers

The 2000 *ibstpi* competencies for instructional design are reproduced in Appendix A. These represent the Board's third set of instructional design competencies – the first set was published in 1986 and the second set was published in 1993. The current set of competencies represent a significant update intended to take into account the impact of technology on the profession (Richey et al., 2001). The process that led to these competencies took three years with most of the 15 member Board actively involved throughout. Numerous focus group discussions, several dissertations and a large scale international survey provided much of the data and input for these competencies.

Based on ten key assumptions elaborated by the Board (Richey et al., 2001), the *ibstpi* competencies cover the whole design process and the different roles that instructional designers may assume. However, it is not expected that instructional designers, regardless of their levels of expertise, demonstrate all competencies, or all performance statements of a given competency. Not only have new areas of design have emerged, but in many cases, instructional designers only focus on some specific areas of the design process. Furthermore, the competencies address generic design issues, but they can be customized to meet the uniqueness of an organization.

Technology has clearly transformed instructional design and is likely to continue to have a very strong influence on what instructional designers do. In general, the Board concluded that being an effective instructional designer had become much more complex and challenging due in part to the pervasive and multi-faceted influence of technology. This fact became obvious in our data gathering phase in the late 1990s: most organizations do not expect instructional designers to master all of the competencies represented in Appendix A. Nevertheless, there was an identifiable set of core competencies – marked as *Essential* in Appendix A – that most instructional designers were expected to master. Moreover, there were other identifiable competencies that represent areas of specialization for experienced instructional designers – these are collectively marked as *Advanced* in Appendix A. The instructional design standards are the only set of *ibstpi* competencies that make this distinction between essential and advanced competencies. Many will argue that in general competencies should represent basic standards that all members of a profession can be expected to master. We would much appreciate your feedback on the issue of distinguishing basic or core competencies from those which specialists and highly experienced professional practitioners might be expected to master.

The Board is currently initiating a process to consider how to update the 2000 instructional designer standards. Contributing to this consideration is the need to have an elaboration of instructional design competencies for those who design and implement online instruction (Goodyear, Salmon, Spector, Steeples & Tickner, 2001; Spector & de la Teja, 2001). The issue of competencies and standards for those who design online instruction is of keen interest to the LICEF Research Center at Télé-université in Canada (<http://www.liceftelug.quebec.ca/eng/index.htm>), with whom the Board is collaborating (one of the authors of this paper works at LICEF and another is the Board's liaison to that organization).

In general, *ibstpi* competencies are data driven and based on the input of professional practitioners and scholars all over the world. The one instance in which the Board chose to overlook this substantial body of evidence was in the area of professional ethics (see competency #5 in Professional Foundations in Appendix A). The evidence that the Board collected indicated that instructional designers were not generally aware of or concerned with ethical obligations and responsibilities. The Board decided that instructional designers do have ethical obligations and responsibilities and should be aware of them. As a consequence, we added “Identify and resolve ethical and legal implications of design in the work place” as an advanced competency (many Board directors thought it should be an essential competency, but the competency validation process is primarily evidence-based). The Board also developed a code of ethical standards for instructional designers (see Appendix B) consisting of six guiding standards recognizing responsibilities to others, three guiding standards representing social mandates, six guiding standards for respecting the rights of others, and six guiding standards for professional practice. The fact that *ibstpi* places such emphasis on ethical standards is meant to reflect an emphasis on instructional design as a professional discipline that has implications for others and for society in general. Instructional design is not simply a trade with tools and techniques to be mastered.

Related competencies and standards

Other sets of related competencies have been developed and disseminated by a number of other professional groups. For example, the International Society for Performance Improvement (ISPI) has developed standards and a certification process for performance technologists (see <http://www.certifiedpt.org/index.cfm?section=standards>). There are ten standards that comprise the ISPI set of standards for performance technology, ranging from focusing on results to being systematic. In addition, ISPI has developed a code of ethics that is comprised of six principles including such things as being honest with clients and maintaining client confidentiality.

The Association for Educational Communications and Technology (AECT) provides competency-based standards for accrediting academic programs in educational technology and library media science; these competencies draw heavily on the *ibstpi* competencies. AECT also has an excellent code of ethics (see <http://www.aect-members.org/standards/standards2004.doc> and <http://www.aect.org/About/Ethics.htm>). The American Society for Training and Development (ASTD) has also developed competency-based standards for a number of certificates, including a Training Certificate, Certification in Professional Learning and Performance, and an E-Learning Instructional Design Certificate (see <http://www.astd.org/astd>).

Additionally, there are competencies and standards for related professional communities, including information science, human factors, and human resources management. The Institute of Electrical and Electronic Engineers (IEEE) has developed and is in the process of developing a number of such standards. Before discussing an example, we would like to suggest that an interesting and worthwhile study might well be designed around these various sets of competencies and standards, including a comparative analysis of the various development processes, the communities served, and the impact on those professional communities.

The IMS (Instructional Management Systems) Global Learning Consortium (<http://www.imsglobal.org/>) has defined competencies in terms of educational objective specifications that are unstructured textual definitions that can be referenced through globally unique identifiers. The notion is to provide communities of practice with access to relevant competencies that pertain to learning, performance and instruction in a particular domain or discipline or community of practice.

It is perhaps worth commenting that we have not distinguished sets of competencies, standards and specifications in this discussion. To do so could be the topic of another engaging discussion and is certainly worth considering. Competencies, specifications and standards might be distinguished along various dimensions, including acceptance, formality, generality, and use, among others.

Various organizations have developed standards that are related to the design, production, delivery and implementation of learning and instructional systems. The more well known acronyms in this area include SCORM (Shareable Content Object Reference Model), LOM (Learning Object Metadata) and XML (Extensible Markup Language). It is not our intent to focus on these standards in this discussion, although it is relevant to consider the extent to which instructional designers and educational technologists are expected to master and implement these standards. At a minimum, instructional designers

are expected to be sufficiently aware in order to be able to collaborate and communicate effectively with professionals who have mastered these standards.

The IEEE Learning Technology Technical Committee

There was an explosion of information and communications technologies in the 20th century. Jobs changed, new jobs appeared, and entire economies were transformed. The impact of these technologies is likely to continue to be significant with many more changes and challenges, especially for instructional designers and educational technologists. What will be required of educational technologists in the 21st century? This question is being addressed by the IEEE Learning Technology Technical Committee (LTTC – see <http://lttf.ieee.org/>).

LTTC (led by Roger Hartley with Rob Koper, Kinshuk, Toshio Okamoto, Demetrios Sampson, Nian-Shing Chen, and Mike Spector) is taking a competency-based approach in its efforts to develop curriculum standards for educational technology at the undergraduate, graduate and post-graduate level. LTTC uses a definition of competency very similar to that used by *ibstpi* but is considering a broader range of competencies that involve job roles and tasks involving information and communications technology as well as traditional instructional design. The group's tentative organizing framework includes clusters of competencies in these areas: Fundamentals of Learning and Technology, Historical Perspectives, Systems Perspectives, User Perspectives, Component Perspectives, Design Requirements, Design Processes, Evaluation, Social Perspectives and Emerging Issues.

There is a related European project called TENCompetence (see <http://www.tencompetence.org/>) that is worth mentioning in this discussion. TENCompetence is a four-year effort recently funded by the European Commission that is aimed at the development of a technical and organizational infrastructure to support lifelong competence development. The TENCompetence infrastructure is intended to support the creation and management of networks of individuals, teams and organizations in Europe who are actively involved in a variety of occupations and knowledge domains. These learning networks will support the lifelong competency development of participants from basic levels of proficiency up to the highest levels of excellence. The network consists of learners, educational institutions, libraries, publishers, domain specific vendors, employers, professional associations, and others who deliver services or products in relevant fields.

The issue of interdisciplinarity and multiple standards is a challenge for our profession. Supporting different communities of practice with different definitions of competency and different standards to exchange information as part of a learning or career plan is a challenging endeavor. As indicated earlier, the IMS Global Learning Consortium has addressed this issue by putting together the Reusable Competency Definition Information Model (<http://www.edtech.vt.edu/edtech/ims/techBoard/rcdinfo.pdf>). The resulting specification is being converted into an IEEE standard with the collaboration of the Learning Technology Standards Committee (LTSC – the group responsible for LOM) in order to promote interoperability between learning systems, human resource systems, learning content specifications, competencies, skill repositories, and other relevant

resources (see http://www.imslobal.org/competencies/RDCEO_memo.pdf and <http://door.sourceforge.net/>) Although many of these technical standards are aimed at vendors and toolmakers, we consider it important to keep track of their implications for design. These various standards affect what designers do, and, therefore, have an impact on instructional design competency.

Use of Competencies and Standards

Human resource development

Competencies and standards can be used to help develop, qualify, distinguish, and/or recognize individual performance and abilities in specific areas. An up-to-date set of competencies can be used by individuals for self-improvement or by personnel departments for skill development by determining whether strengths or deficiencies exist, especially those which might be addressed by training, professional development or changes in policies and procedures. An organization can use competencies to inform and guide hiring practices, for example, as input for job specifications in a position description or job announcement. When applicants have the academic or experiential credentials, they can be further screened against these specific competencies required of the job. Organizations can use these competencies to distinguish between job applicants, especially those with apparently similar academic backgrounds. Using competencies as performance indicators can help managers in organizations conduct substantive, formative assessments, and possibly recognize those individuals who are ready for advancement or who have demonstrated exemplary performance against a standard.

Certification and accreditation

In many professions, certification examinations are based on widely accepted and validated competencies. In the past, certification of technical trainers – by the Educational Testing Service, by Chauncey Group International, and most recently by CompTIA – was based on the 1993 *ibstpi* instructor standards. Although *ibstpi* instructor standards are not currently being used as the basis for certification of technical trainers, many organizations send their training materials to *ibstpi* for review to ensure that these training materials are consistent with current standards (for instructors, training managers, instructional designers and evaluators). When professions do adopt certification examinations, we believe that it is important to have an independent group of professionals responsible for developing the underlying competencies and ensuring that the examination accurately measures performance against those competencies.

In addition to being the basis for certification of individuals, competencies and standards can become the basis for the accreditation of programs intended to prepare and train individuals. For example, one of the standard accrediting agencies in education is the National Council for Accreditation of Teacher Education (NCATE). In the past, when NCATE has evaluated a school or college of education with educational technology and library media science programs, it has asked the Association for Educational Communications and Technology (AECT) to provide its expertise in the evaluation of that program. AECT has made extensive use of the *ibstpi* instructional design competencies

(see Appendix A) in making its recommendations to NCATE with regard to accrediting educational technology and instructional systems programs.

Curriculum development

The *ibstpi* instructional design competencies can also serve as a valuable curriculum design tool. The graduate program in Instructional Design, Development & Evaluation at Syracuse University was recently redesigned using the *ibstpi* instructional design competencies as a critical point of reference. The Instructional Systems program at Florida State University is currently in the process of redesigning its Master's degree program and is using the *ibstpi* instructional design performance statements as the foundation for this effort. The curriculum is being reviewed so as to insure students are provided with instruction and practical experiences that will enable them to acquire and demonstrate attainment of the skills described in the *ibstpi* standards. While a competency-based approach has long been a hallmark feature of the Florida State Instructional Systems program, in the past the program was centered around a set of instructional design competencies that were derived from a variety of published sources. After comparing this eclectic list of skills to the *ibstpi* competencies, the faculty decided that the specificity, clarity and validity of the *ibstpi* competencies made them well suited to serve as guideposts for the current curriculum redesign effort.

Other university programs have also used the *ibstpi* instructional design competencies to guide curriculum development. For instance, Télé-université – the distance learning university of the University of Québec in Montréal and the developer of sophisticated tools and methodologies for distance learning – has teamed up with *ibstpi* to develop training for online instructors and instructional designers that is consistent with *ibstpi* standards.

We would be especially interested in hearing how other programs have developed and updated their curricula. Curriculum development is a process that is at least as challenging as competency development. We encourage those interested in this general topic in continuing the discussion at such meetings as AACE (Association for the Advancement of Computers in Education), AECT (Association of Educational Communications and Technology), ASCILITE (Australian Society for Computers in Learning in Tertiary Education), ASTD (American Society for Training and Development), CELDA (Cognition and Exploratory Learning in the Digital Age), IFTDO (International Federation of Training and Development Organizations), ISPI (International Society for Performance Improvement), PIDT (Professors of Instructional Design and Technology), and TENCompetence (European Network for Lifelong Competence Development). There are probably other relevant meetings and associations, and we hope these will be shared during the ITFORUM discussion.

Concluding Remarks

One might think about competencies as a two-sided coin. On one side of the coin, the competencies might be used to help guide employment decisions and processes. On the other side of this coin, the same competencies might be used to guide certification and remuneration decisions and processes. With such a coin, an employer might decide to fire a

person for lack of competence. Using the same coin, an employee might argue for increased pay based on having demonstrated critical competencies. We hope this is not the only coin in circulation. One can imagine a second coin used somewhat differently. On one side, the competencies may be used to guide professional development, and on the other side the same competencies may be used to identify skills in need of improvement and remediation. We anticipate the discussion of additional uses of competencies.

One issue with which the Board has struggled over the years concerns the granularity of competency and performance statements. When stated generally, competency and performance statements sound quite reasonable, but they may lack the specificity required for hiring decisions, professional development policies, curricula and course plans, or certification exams. On the other hand, if too much detail and specificity is provided, then the elaboration of a competency begins to look too much like a specification for the performance of a well-defined procedure in a particular context. With regard to problem-solving situations that involve somewhat ill-defined tasks (e.g., many design problems), multiple approaches and alternative solutions seem more appropriate than formulaic, procedural descriptions. Do current competencies reflect such complexities? Should they? How? How might too strong a focus on competencies block the road to more integral development of the human being, which could be an interest not specifically associated with any particular employment environment or activity context, but that yet represents a genuine societal concern?

There are a number of issues pertaining more generally to standards that deserve further scrutiny. Standards can serve a useful purpose. Standards pertaining to the accessibility of Web-based resources for those with disabilities have certainly improved access for many to Web-based resources (see Section 508 of the amended Americans with Disabilities Act - <http://www.section508.gov/> - and the World Wide Web Consortium's guidelines for web accessibility - <http://www.w3.org/TR/WAI-WEBCONTENT/>).

However, the other side of a standards coin may be the creation of independent silos with the unintended consequence of conflicting standards. When a subject domain is inherently interdisciplinary and the involved disciplines are well established, it is not difficult to imagine that standards appropriate for one discipline are not well known or wholeheartedly embraced by another discipline. The standards for learning objects may serve as an example of this issue. Having genuinely reusable learning objects that could be easily integrated into many different learning situations and used effectively with many different technologies would be a positive outcome of standards development. However, there appear to be different groups of individuals working on different aspects of this problem (see <http://www.learndev.org> for the archived 2002 AERA papers on learning objects). A computer scientist may have a very different view of a learning object than a cognitive psychologist. An instructional designer might view a learning object as one component of a different entity called an instructional object, which might well represent a third view. The point here is not about learning object standards; rather, the point is about the effect of standards on those who work in inherently multi-disciplinary contexts, as do many instructional designers and educational technologists.

Interdisciplinarity appears to be a fundamental aspect of instructional design and educational technology, yet standards have typically emerged from within a single

discipline. Is there an inherent tension between interdisciplinary work and performance standards? Are there standards that have been developed and proven useful with regard to interdisciplinary teams? A likely place to explore issues pertaining to interdisciplinary teams may be in the domain of emergency medical care. We have not explored that area or the general tension between interdisciplinary teams and discipline-specific standards, but we are especially anxious to find out what others might know or be able to contribute to such an investigation.

In an important sense, we view competencies and standards as tools among other tools that individuals and organizations may use to improve knowledge and performance. As is so often the case, tools may be abused. In such cases, it would be a mistake to blame the tool. Nonetheless, as indicated at the beginning of these remarks, we realize that there are controversies with regard to competencies and their use in our profession and in other fields. In closing, we invite discussion of issues and problems related to competencies within the constructive context of improving individual and organizational learning and performance.

References

- Arguelles, A., & Gonczi, A. (Eds.) (2000). *Competency based education and training: A world perspective*. Mexico City: Grupo Noriega.
- Chappell, C. (1996, November). Quality and competency based education and training. In *The literacy equation: Competency = quality?* (pp. 71-79) [Proceedings of the Conference of the Australian Council for Adult Literacy. Redhill, Queensland, Australia, November 7-9, 1996.
- Evers, F. T., Rush, J. C., & Berdrow, I. (1998). *The bases of competence: Skills for lifelong learning and employability*. San Francisco, CA: Jossey-Bass.
- Fletcher, J. D. (2001). What do shareable instructional objects have to do with intelligent tutoring systems and vice versa? *International Journal of Cognitive Ergonomics*, 5(3), 317-333.
- Fletcher, S. (1997). *Analysing competence: Tools and techniques for analyzing jobs, roles and functions*. Stirling, VA: Kogan Page.
- Goodyear, P., Salmon, G., Spector, J. M., Steeples, C., & Tickner, S. (2001). Competences for online teaching: A special report. *Educational Technology Research & Development* 49(1), 65-72.
- Hyland, T. (1996). National vocational qualifications, skills training and employers' needs. *Journal of Vocational Education and Training*, 48(4), 349-365.
- Klein, G. A., Orsanu, J., Calderwood, R., & Zsombok, C. E. (1993). *Decision making in action: Models and methods*. Norwood, NJ: Ablex.
- Klein, J. D., Spector, J. M., Grabowski, B., & de la Teja, I. (2004). *Instructor competencies: Standards for face-to-face, online and blended settings*. Greenwich, CT: Information Age.
- Klein, J. D., & Richey, R. C. (2005). The case for international standards. *Performance Improvement*, 44(10), 9-14.

- Krems, J. F. (1995). Cognitive flexibility and complex problem solving. In P. A. Frensch & J. Funke (Eds.), *Complex problem solving: The European perspective* (pp. 201-218). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Leung, W-C. (2002). Competency based medical training: Review. *British Medical Journal*, 325(7366), 693-696.
- Lucia, A. D., & Lepsinger, R. (1999). *The art and science of competency models: Pinpointing critical success factors in organizations*. San Francisco, CA: Jossey-Bass.
- Marchese, T. J. (1994). Contexts for competency-based curricula in dental education. *Journal of Dental Education*, 58(5) 339-341.
- Richey, R. C., Fields, D. C., Foxon, M. (with Roberts, R. C., Spannaus, T., & Spector, J. M.) (2001). *Instructional design competencies: The standards* (3rd ed.). Syracuse, NY: ERIC Clearinghouse on Information & Technology.
- Rittel, H., & Webber, M. (1973). Dilemmas in a general theory of planning. *Policy Sciences*, 4, 155-169.
- Spector, J. M., & Anderson, T. M. (2000). *Integrated and holistic perspectives on learning, performance and instruction: Understanding complexity*. Dordrecht: Kluwer.
- Spector, J. M., & de la Teja, I. (2001, December). Competencies for online teaching. *ERIC Digest EDO-IR-2001-09*. Syracuse, NY: ERIC Information Technology Clearinghouse. [Available at <http://www.eric.ed.gov/> by searching on the author, title or ERIC # ED456841.]
- Spiro, R. J., Feltovich, P. J., Jacobson, M. J., & Coulson, R. L. (1991). Knowledge representation, content specification, and the development of skill in situation-specific knowledge assembly: Some constructivist issues as they relate to cognitive flexibility theory and hypertext. *Educational Technology*, 31(9), 22-25.
- Stolovitch, H. D., Keeps, E. J., & Rodrigue, D. (1999). Skill sets, characteristics, and values for the human performance technologist. In H. Stolovitch & E. Keeps (Eds.), *Handbook of human performance technology* (pp. 651-697). San Francisco: Jossey-Bass.
- Voorhees, R. A. (Ed.) (2001). *Measuring what matters: Competency-based learning models in higher education*. San Francisco, CA: Jossey-Bass.

Links

- American Society for Training and Development: <http://www.astd.org/astd>
- Association for the Advancement of Computers in Education: <http://www.aace.org/>
- Australian Society for Computers in Learning in Tertiary Education: <http://www.ascilite.org.au/>
- Australian Vocational Education and Training – Competency Based Training: <http://www.ncver.edu.au/statistics/aag/aus2000/cbt.htm>
- Competency-Based Education: Oklahoma’s Recipe for Success: http://www.okcareertech.org/testing/PDF_Docs/CBE_Revised.pdf
- Digital Open Object Repository: <http://door.sourceforge.net/>
- IEEE Computer Society Technical Committee on Learning Technology: <http://lttf.ieee.org/>
- IEEE Learning Technology Standards Committee – LOM Learning Object Metadata: <http://ltsc.ieee.org/wg12/>

International Federation of Training and Development Organizations:

<http://www.cipd.co.uk/about/intact/IFTDO.htm>

IMS Global Learning Consortium: <http://www.imsglobal.org/background.html>

International Society for Performance Improvement: <http://www.ispi.org/>

International Association for Continuing Education and Training:

<http://www.iacet.org/workshops/seminardescriptions.htm>

International Board of Standards for Training, Performance and Instruction:

<http://www.ibstpi.org>

International Federation of Training and Development Organizations:

<http://www.sovereign-publications.com/iftdo.htm>

International Society for Performance Improvement: <http://www.ispi.org/>

Learning Development Institute: <http://www.learndev.org>

Section 508 of the amended Americans with Disabilities Act: <http://www.section508.gov/>

Society for Human Resource Management: <http://www.shrm.org/>

Télé-université – distance learning university in Canada: <http://www.telug.quebec.ca/>

Training and Further Education - Queensland: Competency Based Training:

http://www.tafe.qld.gov.au/courses/flexible_study/competency.html

TenCompetence – European effort to support lifelong competence development:

<http://www.tencompetence.org/>

W3C OWL Web Ontology Language Working Group:

<http://www.w3.org/TR/owl-features/>

W3C Content Accessibility Guidelines: <http://www.w3.org/TR/WAI-WEBCONTENT/>

Appendix A

The 2000 *ibstpi* Instructional Design Competencies

Copyright 2000-2006, The International Board of Standards for Training, Performance and Instruction

Reprinted from: Richey, R. C., Fields, D. C., Foxon, M. (with Roberts, R. C., Spannaus, T., & Spector, J. M.) (2001). *Instructional design competencies: The standards* (3rd ed.). Syracuse, NY: ERIC Clearinghouse on Information & Technology.

Professional Foundations

1. Communicate effectively in visual, oral and written form. (Essential)
2. Apply current research and theory to the practice of instructional design. (Advanced)
3. Update and improve one's knowledge, skills and attitudes pertaining to instructional design and related fields. (Essential)
4. Apply fundamental research skills to instructional design projects. (Advanced)
5. Identify and resolve ethical and legal implications of design in the work place. (Advanced)

Planning and Analysis

6. Conduct a needs assessment. (Essential)
7. Design a curriculum or program. (Essential)
8. Select and use a variety of techniques for determining instructional content. (Essential)
9. Identify and describe target population characteristics. (Essential)
10. Analyze the characteristics of the environment. (Essential)
11. Analyze the characteristics of existing and emerging technologies and their use in an instructional environment. (Essential)
12. Reflect upon the elements of a situation before finalizing design solutions and strategies. (Essential)

Design and Development

13. Select, modify, or create a design and development model appropriate for a given project. (Advanced)
14. Select and use a variety of techniques to define and sequence the instructional content and strategies. (Essential)
15. Select or modify existing instructional materials. (Essential)
16. Develop instructional materials. (Essential)
17. Design instruction that reflects an understanding of the diversity of learners and groups of learners. (Essential)
18. Evaluate and assess instruction and its impact. (Essential)

Implementation and Management

19. Plan and manage instructional design projects. (Advanced)
20. Promote collaboration, partnerships and relationships among the participants in a design project. (Advanced)
21. Apply business skills to managing instructional design. (Advanced)
22. Design instructional management systems. (Advanced)
23. Provide for the effective implementation of instructional products and programs. (Essential)

Appendix B

The *ibstpi* Code of Ethical Standards for Instructional Designers

Copyright 2000-2006, The International Board of Standards for Training, Performance and Instruction

Reprinted from: Richey, R. C., Fields, D. C., Foxon, M. (with Roberts, R. C., Spannaus, T., & Spector, J. M.) (2001). *Instructional design competencies: The standards* (3rd ed.). Syracuse, NY: ERIC Clearinghouse on Information & Technology.

- I. Guiding Standards: Responsibilities to Others
 - A. Provide efficient, effective, workable, and cost-effective solutions to client problems.
 - B. Systematically improve human performance to accomplish valid and appropriate individual and organizational goals.
 - C. Facilitate individual accomplishment.
 - D. Help clients make informed decisions.
 - E. Inform others of potential ethical violations and conflicts of interest.
 - F. Educate clients in matters of instructional design and performance improvement.

- II. Guiding Standards: Social Mandates.
 - A. Support humane, socially responsible goals and activities for individuals and organizations.
 - B. Make professional decisions based upon moral and ethical positions regarding societal issues.
 - C. Consider the impact of planned interventions upon individuals, organizations, and the society as a whole.

- III. Guiding Standards: Respecting the Rights of Others
 - A. Protect the privacy, candor, and confidentiality of client and colleague information and communication.
 - B. Show respect for copyright and intellectual property.
 - C. Do not misuse client or colleague information for personal gain.
 - D. Do not represent the ideas or work of others as one's own.
 - E. Do not make false claims about others.
 - F. Do not discriminate unfairly in actions related to hiring, retention, and advancement.

- IV. Guiding Standards: Professional Practice
 - A. Be honest and fair in all facets of one's work.
 - B. Share skills and knowledge with other professionals.
 - C. Acknowledge the contributions of others.
 - D. Aid and be supportive of colleagues.
 - E. Commit time and effort to the development of the profession.
 - F. Withdraw from clients who do not act ethically or when there is a conflict of interest.

Biographical Sketches

J. Michael Spector

J. Michael Spector is Associate Director of the Learning Systems Institute and Professor of Instructional Systems at Florida State University. Previously he was Professor and Chair of Instructional Design, Development & Evaluation at Syracuse University and Professor of Information Science and Director of the Educational Information Science & Technology Research Program at the University of Bergen, Norway. He was the Senior Scientist for Instructional Systems Research at the United States Air Force Armstrong Research Laboratory from 1991-1996. Before joining Armstrong Laboratory, Dr. Spector was an Associate Professor of Computer Science at Jacksonville State University. His research is in the areas of learning in complex domains, intelligent performance support for instructional design, and system dynamics based learning environments. He has published widely in the area of instructional design research and technology enhanced learning and instruction. He is active in professional associations and serves on the editorial boards of several journals. He was awarded a Fulbright research fellowship (1995/1996) to work at the University of Bergen creating and testing an interactive simulation of project dynamics for large-scale courseware development efforts. Dr. Spector served on the International Board of Standards for Training, Performance and Instruction (*ibstpi*) as Executive Vice President, is a member of the IEEE Learning Technology Technical Committee, is a past-President of the Design and Development Division of the Association for Educational and Communications Technology (AECT), and is Editor of *ETR&D-Development*.

James D. Klein

James D. Klein is a Professor and Program Leader in the Educational Technology program at Arizona State University, Tempe. He currently serves as a director and treasurer of the International Board of Standards for Training, Performance and Instruction (*ibstpi*). He was lead author on the *ibstpi* book, *Instructor competencies: Standards for face-to-face, online, and blended settings*, which won the 2005 outstanding book award presented by the Design and Development Division of AECT. Previously, he served as development editor of *Educational Technology Research & Development* and as president of the Design and Development Division, and the Research and Theory Division of AECT. He has been recognized as an outstanding alumnus of the Instructional Systems Program at Florida State University and for his service to the Design and Development Division. Dr. Klein's research, teaching and consulting activities are in the areas of instructional design, strategies for active learning, and performance improvement. He can be reached at James.Klein@asu.edu.

Robert A. Reiser

Robert A. Reiser is a Distinguished Teaching Professor and the Robert M. Morgan Professor of Instructional Systems in the Department of Educational Psychology and Learning Systems at Florida State University. He received his doctorate in Educational Technology from Arizona State University. Reiser has written four books in the field of

instructional design and technology, including *Selecting Media for Instruction* (written with Robert M. Gagné), *Planning Effective Instruction* and *Instructional Planning: A Guide for Teachers* (both written with Walter Dick), and *Trends and Issues in Instructional Design and Technology* (edited with John V. Dempsey, second edition to be published in 2006), which was awarded the 2002 AECT James W. Brown Outstanding Publication Award. Reiser has also written more than fifty journal articles on instructional design and technology. His areas of research and publications include mastery learning, media selection, instructional effectiveness of educational software and instructional television, technology integration, history of the field, instructional planning, and cognitive load theory. In the service area, Reiser has chaired his department for nine years and is currently the program leader of the Instructional Systems program. At the national level, he is chair of AECT/ Design and Development (D&D) Awards Program and has served 17 years as an editorial board member of ETR&D. He is a three time winner of the D&D Outstanding Service Award. At FSU, Reiser has received a Professorial Excellence Award, a Developing Scholar Award, a University Teaching Award, and the University Distinguished Teacher Award, the highest teaching award at Florida State.

Roderick C. Sims

Roderick C. Sims is Principal Consultant with Knowledgecraft, which specializes in design strategies for online teaching and learning. Dr. Sims is also Adjunct Professor, Instructional Design for Online Learning, with Capella University, where he teaches online and supervises doctoral students. Over the past 16 years, Dr. Sims has held senior academic posts at the University of Technology Sydney, Southern Cross University and Deakin University, managing programs in interactive multimedia, instructional design, courseware development and strategies for effective interactive learning; he has also taught computer programming and systems analysis in these positions. Dr. Sims has a background of over 30 years in the computer and education sectors, with commercial experience in mainframe and personal computer systems, operating systems, online databases and application software. Recently Dr. Sims was the Academic Director for QANTM Education, a private provider of higher education programs. Dr. Sims is a Fellow of the Australian Computer Society (ACS), a Fellow and Past-President of the Australian Society for Computers in Learning in Tertiary Education (ASCILITE; he was convenor of the 1992 and 2000 ASCILITE conferences), and Past-President of the Division of Learning and Performance Environments (DLPE) in the Association for Educational and Communications Technology (AECT). He has published extensively in the field of educational computing, and he is a regular presenter at Australian and International conferences. His current research activity is focused on instructional design, efficiency and effectiveness in e-learning, transformational learning experiences, and the pedagogical implications of multi-user learning environments. Rod is currently Executive Vice President of *ibstpi*.

Barbara L. Grabowski

Barbara L. Grabowski is the President of the International Board of Standards for Training, Performance and Instruction and Professor of Education in the Instructional

Systems Program in the College of Education at the Pennsylvania State University. Recently, she was the Curriculum Director for two NSF funded nanotechnology grants and Principal Investigator of two instructional research grants with the National Aeronautics and Space Administration (NASA). She has held academic appointments at Syracuse University and the University of Maryland School of Medicine. While at the University of Maryland University College, she was a designer, developer and evaluator of a distance degree program for nuclear reactor operators, and designer of multimedia materials for industry, the military, and medical environments. Dr. Grabowski's research is generally in the area of active learning through and with technology, including the types of learning opportunities made possible by technology, the integration of the Internet in educational settings, and changing roles of teachers brought about by the Web. She has been nationally and internationally recognized by the International University Continuing Education Association for her innovative distance education program. Dr. Grabowski is particularly known for her publications in the area of generative learning, individual differences (with David Jonassen) and the development of Web-based strategies to enhance learning in K-12 – Web-Enhanced Learning Environment Strategies (WELES). She has made many presentations over the years, including invited addresses in Brazil, Canada, Singapore, Finland, Australia, China, and Germany.

Ileana de la Teja

Ileana de la Teja is a Senior Researcher at Télé-université – the distance learning university of the University of Quebec in Montreal, Canada. Dr. de la Teja's main responsibilities include conducting research and development of methodologies for the design of effective learning and training systems using knowledge modeling and instructional design principles and tools developed at LICEF. She specializes in evaluation processes for distance learning (the general topic of her dissertation) and has co-edited a special issue of *Evaluation and Program Planning* focusing on the evaluation of educational technology. Her research interests include design tools for distance evaluation, distributed learning, knowledge management, and intelligent advising systems. She is an *ibstpi* Director and the Executive Secretary for the Board. Ileana has published in both French and English. She published (with Lundgren-Cayrol and Paquette) a widely read revue of distance education in Canada and has several publications and presentations pertaining to the MISA, a learning systems engineering method, and MOT, a knowledge modeling tool. She is also a co-author (with Klein, Spector and Grabowski) of the award winning *ibstpi* Instructor Standards published in 2005.