

Multimedia Competencies for Instructional Technologists

Florence Martin, Bethanne Winzler, Ian Jones
Matthew Gaysford, Jessica Shartle, Whitney McSwain, and Kara Lee
University of North Carolina, Wilmington
martinf@uncw.edu

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Abstract

The goal of this study was to identify multimedia competencies that an instructional technology graduate student should be familiar with before entering the real world. This study focused on three different aspects of multimedia design and development: (1) multimedia knowledge competencies, (2) multimedia skill competencies, and (3) multimedia tool competencies. The results of this survey help instructors stay current with the instructional material taught in multimedia courses and prepare students for their future work environment.

Introduction

The term multimedia defines applications and technologies that include text, data, images, voice, and full-motion video objects. Instructional designers develop a variety of multimedia products, such as print-based materials, job aids, electronics support systems, Web sites, games, and simulations. It is essential for instructional technologists to develop high-quality multimedia products. "Quality" in a multimedia product signifies (1) functionality, (2) look and feel, and (3) effective instructional content. For students to stay current with the latest multimedia tools in the market and develop quality products, it is important to identify multimedia that they have to be competent in.

Multimedia Learning

According to the cognitive theory of multimedia learning, the learner engages in three important cognitive processes (i.e., selecting, organizing, and integrating). Selection is applied to visual information, organizing is applied to verbal information, and, finally, the visual and the verbal information are integrated together (Mayer, 1997). Mayer researched multimedia learning principles, which proved that learning was effective when these principles were used in the design and development of multimedia products. Some of Mayer's multimedia principles are the temporal and spatial contiguity principle, split-attention principle, individual differences principle, and coherence principle (Mayer, 2001).

Models have been developed for multimedia learning and for multimedia design and development. Hede's model (2002) included learner control, learner strategies, visual input, verbal input, motivation, and cognitive engagement as some factors that affect learning from multimedia. Multimedia learning can be used for instruction that involves cognitive activity, and the instruction can be learner-centered rather than teacher-centered; learner-centered is where learners have control over their learning and can pace around the multimedia instructional material.

Multimedia Design and Development

Alessi and Trollip (2001) list four elements that can make multimedia learning environments more effective: (1) presentation of information, (2) guidance on how to proceed, (3) practice for fluency and retention, and (4) assessment to determine the need for remediation and next steps. Good practices and design guidelines have been researched by a number of authors. With a good grounding in theory and the practical design guidelines, successful and good quality multimedia products have been produced.

However, it is important to periodically evaluate theory-based knowledge in multimedia development, the skills required, and the tools that can make an instructional technologist successful in today's job market.

Importance of Competencies

A key aspect of being an educator is ensuring that all curricula being taught in degree programs is correctly aligned with the expectations of the particular fields those students will enter in the future. When dealing with the instructional technology field, it is essential for instructors to teach material that learners will transfer to their professional careers. As with all certification programs, instructional technology programs must ensure that all required skills and competencies are taught before allowing learners to progress into their careers. The goal of instructional technology programs is to ease the transition from being a student to being an instructional design and technology specialist. In this field of study, it is essential to tackle the area of multimedia competencies with force and to make sure all information is accurate and in-depth for all learners. Since technology and software are constantly shifting, it may be difficult to gauge the use and competency of certain multimedia principles.

Purpose of the Study

The goal of this study was to identify multimedia competencies that an instructional technology graduate student should be familiar with before entering the real world. The study was prepared to analyze what material is considered to be important by the instructional technologist currently in the field. It focuses on diverse aspects of the instructional technology and design field, as well as other components. The results of the survey also assure students that the material being covered in their coursework is going to be effectively used in their future work environment.

Method

This study focused on the importance of various multimedia competencies (knowledge, skills, and tools). Twenty-eight instructional design and technology professionals were surveyed on the importance and everyday use of multimedia competencies in their present day workplace. The results discussed herein will provide information pertaining to multimedia competencies and the commonality of their use.

Survey

The survey was comprised of 26 questions that measure the importance of an individual's competency in various aspects of instructional technology and design. The questions were arranged into three explicit categories: knowledge, skills, and tool competencies. The survey was sent by e-mail to University of North Carolina at

Wilmington's (UNCW's) instructional technology alumni, various instructional technology and design professionals, and select employees at UNCW. The survey questions required subjects to respond on a scale of one to four, where one represented the least important competency and four represented the most important competency.

In the knowledge competency section, there were questions pertaining to the importance of design. The first section focused on the importance of using and applying design principles in the production of multimedia projects and materials. The second section was centered on the importance of multimedia skills for the success of multimedia development. The third and final section of questions focused the importance of diverse multimedia tools. Respondents were asked to rate each multimedia tool based on how important that tool has been throughout their design and development of multimedia instructional material. The results of the Multimedia Knowledge Competencies are reported in **Table 1**.

Participants

A total of 33 subjects responded to the survey; however, only 28 responded to the entire survey. Five subjects (15%) had a bachelor's degree, 13 subjects (39%) had a master's degree, and 15 subjects (45%) had a doctoral degree. The employment spectrum was very broad, including 3 K-12 teachers, 23 college or university instructors, and 7 people that held corporate positions.

Results Multimedia Knowledge Competencies

Table 1. *Multimedia Knowledge Competencies*

	Multimedia Knowledge 1=Unimportant, 2=Somewhat Important, 3=Important, 4=Very Important	Average Response
1	Multimedia design principles, including instructional objectives with practice and feedback activities	3.55
2	Multimedia learning based upon cognitive learning theory, such as working memory and the transfer of words and pictures into long-term memory	3.52
3	Intrinsic and extrinsic motivational strategies for attention, relevance, confidence, and satisfaction	3.50
4	The usability measurement principles of multimedia learning tools: effectiveness, efficiency, and satisfaction	3.48
5	Multimedia design principles, such as spatial contiguity, coherence, modality, and redundancy	3.41
6	Color in regard to organizing, selecting, and integrating difference	3.29

	aspects of multimedia design	
7	Development in multimedia, including human-to-computer interaction	3.24
8	Current research and theory in regard to multimedia	3.24
9	Accessibility and compliance with its laws in instructional delivery	3.14
	Average	3.37

The overall mean for Multimedia Knowledge Competencies was 3.37. Five items in the knowledge competencies were rated above 3.5 and were considered as very important by the multimedia designers. Among these 5 items were the development of instructional objectives, practice and feedback, cognitive learning theory, motivational strategies, usability measurement principles, and Mayer's multimedia design principles. Although the remaining knowledge competences were not above 3.5, they were all rated as important, and the means were between 3.29 and 3.14. Accessibility and compliance was rated the lowest (M=3.14). The results of the Multimedia Skill Competencies are reported in **Table 2**.

Multimedia Skill Competencies

Table 2. *Multimedia Skill Competencies*

	Multimedia Skills 1=Unimportant, 2=Somewhat Important, 3=Important, 4=Very Important	Average Response
1	Web Design	3.61
2	Graphic Design	3.30
3	Job Aids	3.07
4	Simulations	3.00
5	Print Design	2.96
6	Electronic Performance System Design	2.96
7	Animation	2.82
8	Designing for Mobile Devices	2.48
9	Game Design	2.41
10	Podcasting	2.27
	Average	2.96

Web design was rated as the most important multimedia skill (M=3.61). Graphic Design, Creating Job Aids, and Simulations were above 3.0, and Print design and Electronic Performance System Design were slightly lower (M=2.96). Designing for Mobile Devices (M=2.48) and Game Design (M=2.41) were toward the lower end of the table, and Podcasting was rated the lowest (M=2.27).

An equivalent graphical representation of the tabulated data is shown in **Figure 1**.

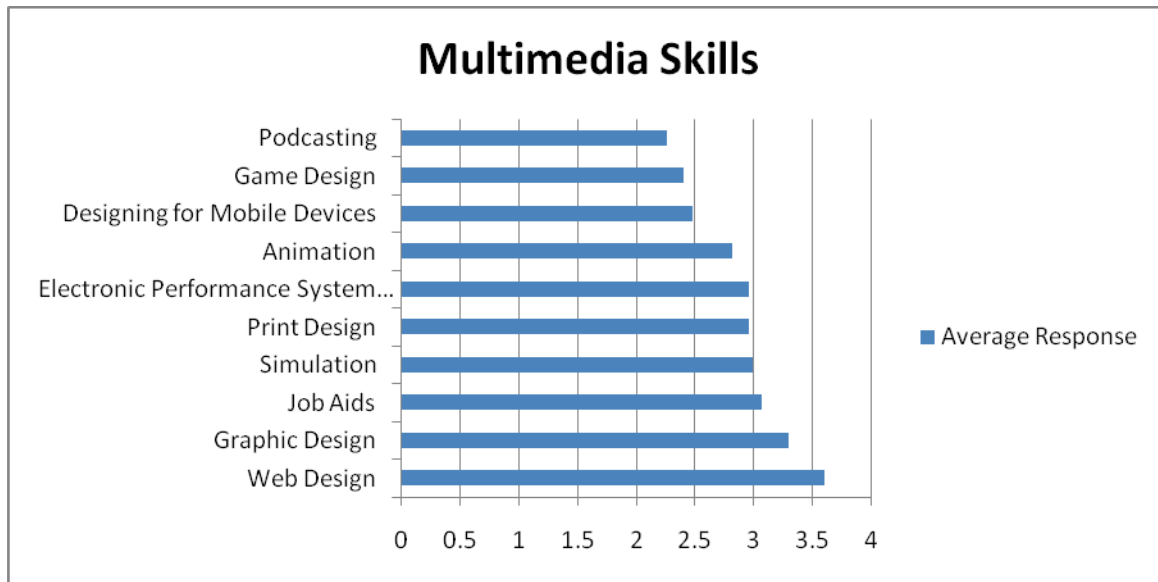


Figure 1. Multimedia Skill Competencies

Multimedia Tool Competencies

The results of the Multimedia Tool Competencies are reported in **Table 3**. Among the 18 items in this category, Web Design tools were reported to be the most important tools for multimedia development, along with Graphic Editing tools (M=3.56). Word Processing tools were rated 3.52. Learning Management Systems, Asynchronous Communication tools, Demonstration tools, Presentation tools, Animation tools, and Synchronous Communication tools were rated 3.00. There were 9 tools that were rated below 3.00, which were still considered important. Virtual Environment tools were rated the lowest (M=2.23). There was nothing rated below 2.00, which might have been considered unimportant.

Table 3. Multimedia Tool Competencies

	Multimedia Tools 1=Unimportant, 2=Somewhat Important, 3=Important, 4=Very Important	Average Response
1	Web Design (i.e., Dreamweaver, FrontPage)	3.56
2	Graphic Editing (i.e., Photoshop, Fireworks)	3.56
3	Word Processing (i.e., Word, WordPerfect, Microsoft Word)	3.52
4	Learning Management Systems (i.e., WebCT, Blackboard, Moodle)	3.44
5	Asynchronous Communication (i.e., Discussion Boards)	3.41
6	Demonstration (i.e., Captivate, Wink)	3.37
7	Presentation (i.e., PowerPoint)	3.33
8	Animation (i.e., Flash)	3.19
9	Synchronous Communication (i.e., Breeze/Connect, LiveMeeting, Skype)	3.19
10	Video Editing (i.e., FinalCut, iMovie, Adobe Premiere)	2.96
11	Survey (i.e., SurveyMonkey, SurveyGold)	2.96
12	Collaboration (i.e., Wikis, Google Docs)	2.93
13	Audio Editing (i.e., GarageBand, Audacity)	2.89
14	Desktop Publishing (i.e., Publisher)	2.78
15	Authoring (Authorware)	2.78
16	Spreadsheet (i.e., Excel)	2.67
17	Database (i.e., Access)	2.56
18	Virtual Environments (i.e., SecondLife)	2.23

An equivalent graphical representation of the tabulated data is shown in **Figure 2**.

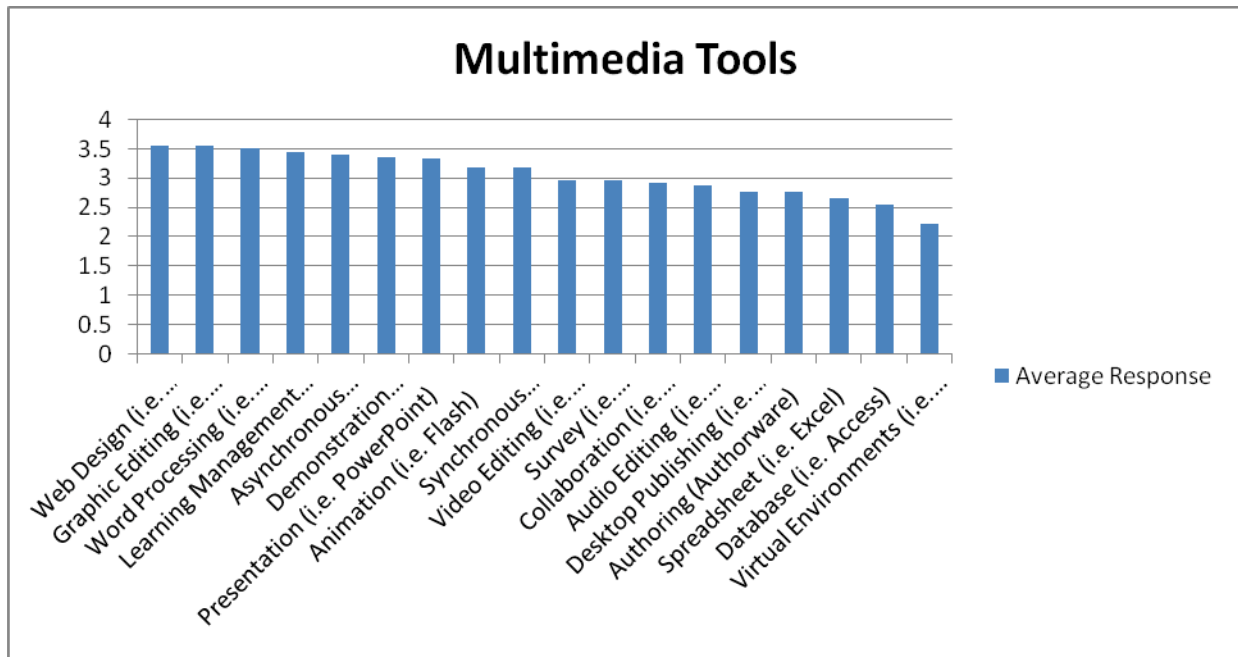


Figure 2. *Multimedia Tool Competencies*

Discussion

Among the three sets of data, we did not have any means below 2.00 to be considered as unimportant. The lowest rated items were considered to be somewhat important, the items in between were considered to be important, and the highest rated items were considered to be very important.

Web Design skills and tools were rated the highest in two categories, stressing the importance of Web Design as a multimedia skill needed for instructional technologists. It was interesting to note that Accessibility and Compliance were rated the lowest in the Multimedia Knowledge Competencies category, which still translates to somewhat important.

Graphic Design was considered an important skill for instructional technologists, rating even higher than the skill of creating Instructional Job Aids, Simulations, and Print Material. It was surprising that Podcasting was rated the lowest, and the audience thought that it was not very important for instructional designers to create podcasts. Again, this should not be mistaken that it was rated as unimportant; even though it was rated the lowest on the table, it was still in the range of being considered important.

In the Multimedia Tool Competencies category, Virtual Environments (e.g., Second Step) were considered only somewhat important.

The data from this survey could be used to design the instructional technology design and development courses. Colleges and universities need a basis for developing course material and meeting the requirements of students throughout the semester. By viewing this survey and analyzing data, you can see that there is a variety of skills learned throughout a degree program that are implemented in the business world.

References

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