

# **Multimedia Competencies for Instructional Technologist**

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## **Abstract**

The goal of this study is to identify multimedia competencies that an instructional technology graduate student should be familiar with before entering the real world. This study focuses 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 helps an instructor stay current with the instructional material taught in multimedia courses and prepares the student 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 material, job aids and electronics support systems, websites, 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 the students to stay current with the latest multimedia tools in the market, and develop quality products it is important to identify multimedia competencies 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 (selecting, organizing and integrating). Selection is applied to visual information, organizing is applied to the verbal information and finally, the visual and the verbal information is integrated together (Mayer, 1997). Mayer researched on the 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 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, Cognitive engagement to be some of the 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 in the sense where learners have control over their learning and can pace around the multimedia instructional material.

### **Multimedia Design and Development**

Alessi and Trollip list four elements that can make multimedia learning environments) more effective 1) Presentation of information 2) Guidance about how to proceed 3) Practice for fluency and retention and 4) Assessment to determine need for remediation and next steps (Alessi & Trollip, 2001). Good practices and design guidelines have been researched by a number of authors. Along with 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 the theory based knowledge on multimedia development, the skills required and the tools in the market that can make an instructional technologist successful in today's job.

### **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 career. As with all certification programs, instructional technologists must ensure that all required skills and competencies are taught before allowing learners to progress into the careers. The goal Instructional Technology programs are 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 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 study**

The goal of this study is to identify multimedia competencies that an instructional technology graduate student should be familiar with before entering the real world. This study was prepared for the purpose of analyzing what material is considered to be important by the instructional technologist currently in the field. This study focuses on diverse aspects of the instructional technology and design field, as well as other components. The results of this survey also assure students that the material being covered in their course work load 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). 28 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, the commonality of their use.

### **Survey**

The survey comprised of twenty six questions which 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 out by email to University of North Carolina Wilmington's Instructional Technology alumni, various instructional technology and design professionals and select employees at the University of North Carolina at Wilmington. The survey questions required subjects to respond on a scale of four to one where one represented the least important competency and four represented the most important competency.

In the knowledge competency section there were questions pertaining to importance of design. This 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, development of multimedia instructional material.

### **Participants**

A total of 33 subjects responded to the survey out of which only 28 of them had 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 three K-12 teachers, 23 College or University teachers, and 7 corporate positions.

### **Results**

#### **Multimedia Knowledge Competencies**

*Table 1*  
*Multimedia Knowledge Competencies*

	<b>Multimedia Knowledge</b> ( 4=Very Important, 3=Important, 2=Somewhat Important, 1=Unimportant)	<b>Average Response</b>
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	3.5
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 regards to organizing, selecting, and integrating difference aspects of multimedia design	3.29
7	Development in multimedia to include human to computer interaction	3.24
8	Current research and theory in regards to multimedia	3.24
9	Accessibility and compliance with its laws in instructional delivery	3.14
	Average	3.37

The results of the multimedia knowledge competencies are reported in Table 1. The overall mean of all the items in this section was (M=3.37). Five items in the knowledge competencies were rated above (M=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. Though the remaining knowledge competences were not above (M=3.5), there were all rated as important and the means were between (M=3.29) and (M=3.14). Accessibility and compliance was rated the lowest at (M=3.14)

### **Multimedia Skill Competencies**

*Table 2*  
*Multimedia Skill Competencies*

	<b>Multimedia Skills</b>	<b>Average Response</b>
	4=Very Important, 3=Important, 2=Somewhat Important, 1=Unimportant	
1	Web Design	3.61
2	Graphic Design	3.3
3	Job Aids	3.07
4	Simulation	3.0
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

The results of the Multimedia Skill Competencies are reported in Table 2. Web design was rated as the most important multimedia skill (M=61). Graphic Design, Creating Job Aids and Simulations above 3.0 and Print design and EPSS design slightly lower at (M=2.96). Designing for Mobile devices (M=2.48) and Game Design (M=2.41) were towards the lower end of the table and podcasting was rated the lowest at (M=2.27).

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

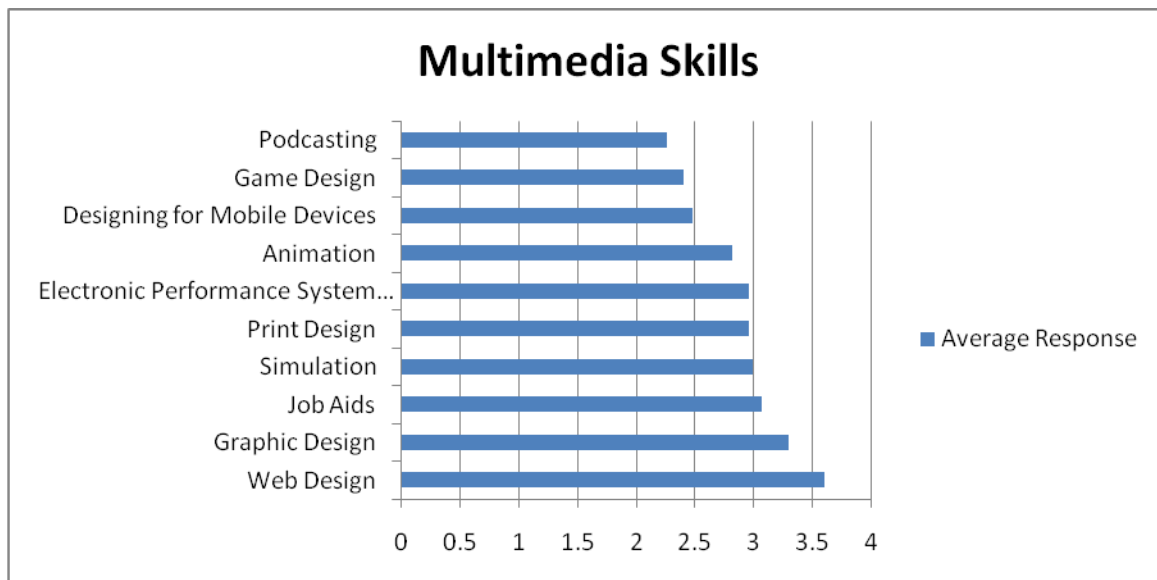


Figure 1. Multimedia Skill Competencies

### 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 most important tool for multimedia development along with Graphic editing tools (M=3.56). Word processing tools were also rated above (M=3.52). Learning Management Systems, Asynchronous communication tools, Demonstration tools, Presentation tools, Animation tools, and Synchronous communication tools were rated above (M=3.00). There were 9 tools that were rated below (M=3.00) which were still considered important. Virtual Environment tools being rated the lowest (M=2.23). There was nothing rated below (M=2.00) which could have been considered unimportant.

*Table 3*  
*Multimedia Tool Competencies*

	<b>Multimedia Tools</b>	<b>Average Response</b>
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 (Captive, 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

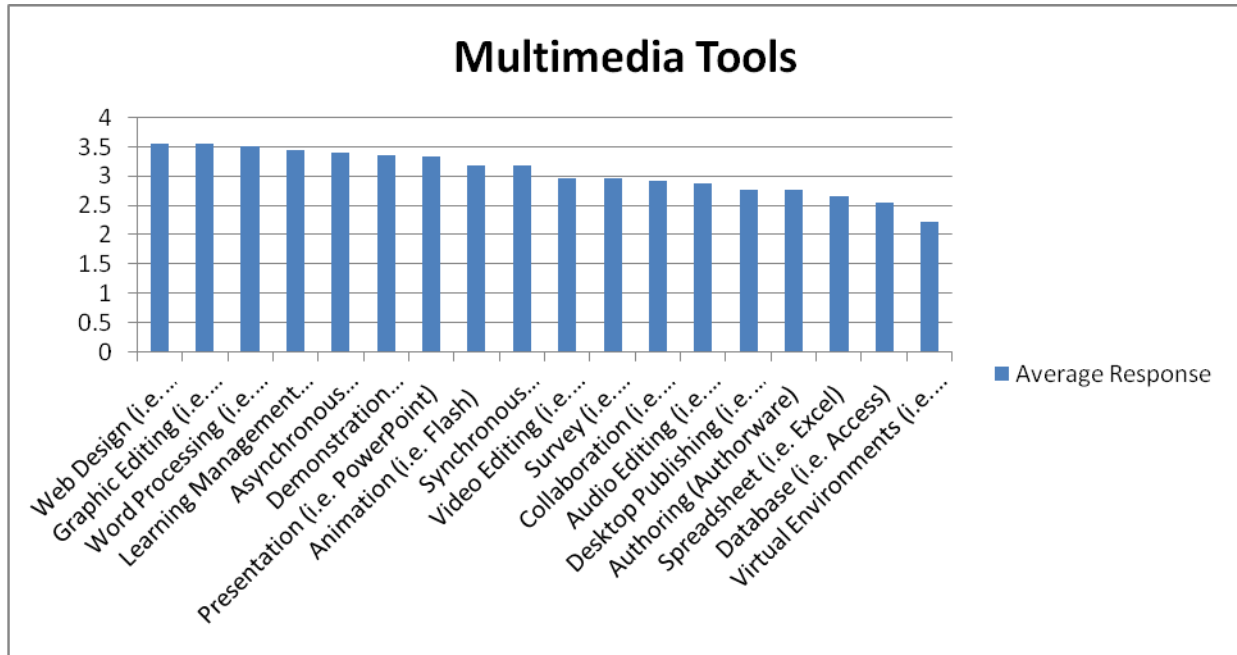


Figure 2. Multimedia Tool Competencies

### Discussion

Among the three sets of data, we did not have any means below (M=2.00) to be considered as unimportant. The lowest rating items were considered to be somewhat important, and the between ones were considered to be important and the highest rating ones were considered as 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 technologist. It was interesting to note that accessibility and compliance were rated the lowest in the knowledge category, which still translates to somewhat important.



Graphic design skill was considered as an important skill for instructional technologists, 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 at the lowest of the table, it was still in the range of being considered important.

In the tool category, virtual environments (eg. Second Life) 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 course material and requirements of student throughout the semester. By viewing this survey and analyzing data, one would see that there is a variety of skills learned throughout a degree program, which are implemented in the business world.

### **References**

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