Title

A Comparison of the Effectiveness of Written Instructions and Multimedia Tutorials for *Call of Duty: Modern Warfare 2*

Abstract

In this paper, I compare and discuss the effectiveness of written instructions and multimedia tutorials as they relate to the Infinity Ward video game *Call of Duty: Modern Warfare 2*. Effective written instructions and effective multimedia tutorials use cognitive load theory (CLT) and instructional design theory (IDT) in order to effectively express their messages to audiences. This paper explains the following: my proposed thesis project, changes that occurred during the lifecycle of the project, what CLT and IDT are and how they affect instructions, the methodology for my project, how I collected data in my experiment and why I used that method. Following this, the paper discusses the results of my experimentation and makes a recommendation of the most effective instruction method based on those results. The paper concludes with my final thoughts on the project.

Author

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Thesis Committee

Dr. Joey Brown, Faculty Mentor

Dr. Barry Brown, Committee Member

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Project Description

The Proposed Thesis Project

The originally proposed thesis project was aimed at examining the differences between multimedia tutorials and written instructions while comparing their effectiveness in teaching a specific task. The project was deemed relevant to the technical/professional writing field because instructions are a key part of technical writing and their effectiveness compared to other teaching methods needs to be considered when attempting to engage audiences. The original project called for a 40-person study sample that would be tested and scored based on their ability to complete a task after reading instructions for the task or being given a tutorial for the task. At the conclusion of the study, the more effective method of teaching was to have been recommended. The hypothesis of the study was that multimedia tutorials would be the more effective method of instruction.

The originally proposed project was to have been evaluated based on consultation with the professor, four written progress reports with minimum lengths of two pages, a written description of planned methods for data collection, and a final presentation paper of the project's findings and an analysis of the project. Were the proposed project evaluated on a standard grading scale, the items would have been weighted as follows: preparedness / participation – 10%, progress reports – 15%, data collection description – 20%, paper conference with draft – 5%, final draft research paper – 50%.

This proposed project was approved Spring 2010; it was scheduled to begin Fall 2010 and end Spring 2011.

The Completed Thesis Project

The actual project I completed for my thesis changed slightly from the proposed project. The title of the project changed to "A Comparison of the Effectiveness of Written Instructions and Multimedia Tutorials for *Call of Duty: Modern Warfare 2*" instead of "Effective Methods of Teaching: A Comparison between Written Instructions and Multimedia Tutorials" to more accurately describe the content of the project, which was a comparison of the performance of two test groups (one group using written instructions and one using a multimedia tutorial) on the difficulty-recommendation level of *Modern Warfare 2* (*MW2*). The project was still relevant for the same reason as the proposed project, but the methods for testing were modified.

The original project called for a 40-person study group, but Dr. Joey Brown and I decided that goal was likely unattainable. Instead, I distributed a survey to roughly 100 people on March 14, 2011, and collected their responses by March 19; from those people, I selected a hypothetical study group of survey respondents that met the necessary criteria for participation in my testing. The hypothetical group was 30 people. On March 21 I e-mailed the hypothetical participants to arrange times for testing. Ten of them responded, resulting in a test group of ten participants. The testing was conducted per the originally proposed project, using the difficulty-recommendation level of *MW2*, with the goal of proving that multimedia tutorials were a more effective method of instruction, between March 28 and April 1.

The evaluation of the completed thesis project was modified slightly from the proposed project. Rather than four two-page progress reports, a description of the planned data collection, and the final presentation paper, I wrote three papers (of two pages each minimum) over sub-topics that related to the paper (instructional design theory, cognitive load theory, and data collection theory), the potential participant survey, the instructions used for the testing, and a presentation paper of 15 pages minimum. Meetings with the professor occurred after the completion of each document. Evaluated on a standard grading scale, the items were weighted as follows: preparedness / participation – 10%, sub-topic papers – 30%, potential participant survey – 10%, written instructions – 10%, final paper – 40%.

I began work on the completed version of my thesis project in December of 2010. The written instructions and potential participant survey were completed by March 12, 2011. The sub-topic papers were completed by March 30, 2011. Study-group participants were selected by March 27, 2011; testing occurred between March 28, 2011, and April 8, 2011. The final paper was submitted as a rough draft on April 15, 2011. The final draft of the paper was submitted April 22, 2011. The findings of my research were scheduled to be presented on May 5, 2011.

Instructional Design Theory

The first sub-topic paper that I wrote for the thesis project explored instructional design theory, or IDT. Instructional design theory examines how learning occurs and how learning from instructions can be maximized. The majority of IDT is approached through three paradigms known as objectivism, constructivism, and enactivism (Li, 2009). Objectivism is a dualistic paradigm in which reality is external to the mind; it claims that the mind exists to process symbols and mirror nature's reality, that cognition is mechanical, and that knowledge can be acquired. Objectivism was supplanted by constructivism, another dualistic paradigm. Constructivism claims that cognition is mechanical, but that knowledge is constructed rather than acquired; it did not address all of the issues that instructional designers had with objectivism, though, so enactivism was developed. Enactivism is not dualistic, and claims that knowledge and the knower are the same; in enactivism, cognition is biological and leads to knowledge that is not purely internal or external to the learner, but instead is a mixture of internal and external ideas. These paradigms play an important role in instructional design because they provide instructional designers with multiple approaches to developing instructions. More important, though, are the five characteristics of instructional design.

The most important aspects of IDT are the five characteristics of instructional design: analysis, design, development, implementation, and evaluation (Magliaro, 2006). Several studies show that learners reject instructions regardless of the paradigm in which they are written if the ID characteristics are not present. This finding suggests a need for a universal ID that incorporates numerous paradigms while maintaining the key characteristics of ID and permits designers to reach multiple audiences regardless of the learners' preferred paradigms. The problem with developing this universal ID is the delivery system: diverse audiences require diverse deliveries, including visual, auditory, or other systems.

To meet this need, some instructional designers are turning to multimedia instruction (MMI), which allows them to express instructions in several manners simultaneously (Wildman, 1981). Instructional designers have conducted numerous experiments, and find that in most cases, tutorial-based MMI is as-effective if not more effective than traditional instruction methods (Stegeman, 2010). However, other designers feel that MMI needs improvement before it can effectively replace traditional instructional methods such as written instructions. Researchers are performing experiments that examine the tone of MMI (Kartal, 2010), the types of media included in MMI, and other potential methods for increasing MMI-effectiveness such as the cognitive load associated with multimedia instruction.

Cognitive Load Theory

The second sub-topic paper required by my thesis project investigated cognitive load and its implications in instructional design. Cognitive load (CL) is one of the problems that instructional designers face regardless of their use of MMI or traditional instruction. CL represents the amount of thought-processing required by a learner to assimilate given information (Paas, “Cognitive Load Measurment,” 2003). Cognitive load theory, or CLT, examines how to minimize cognitive load (also known as channel load) so that it can positively affect the learning process. CLT treats each piece of information in instructions as an individual element and assigns it a level of interactivity, maintaining that humans are capable of learning material with high levels of interactivity through working and long-term memory (Paas, “Cognitive Load Theory,” 2003). Working memory is thought to handle two to three interactions; long term memory develops *schemas* that combine multiple elements into single structures for quick recall. Using working and long-term memory, the human mind handles three types of cognitive load: intrinsic cognitive load, extraneous cognitive load, and germane or effective cognitive load (Paas, “Cognitive Load Theory,” 2003).

Intrinsic cognitive load is determined by the material to be learned; it cannot be changed unless an element of the material with a high level of interactivity is replaced with an element that has a lower level of interactivity. This substitution can decrease understanding but is sometimes required for learning high-interactivity materials. Germane cognitive load is a positive influence to learning; this is what allows working memory to develop *schema* for further use. Extraneous cognitive load interferes with learning; it occurs when learners are forced to do more work than necessary to learn an element. Many researchers argue that multimedia instruction imposes more extraneous cognitive load on learners than written instructions because learners receive information in too many manners.

Most MMI includes an animated narration and redundant on-screen text in an attempt to appease both auditory and visual learners (Mayer, 2001; Moreno, 2000). However, this can lead to a redundancy effect in which poorer learning occurs because learners become distracted by the variety of inputs (Mayer, 2001). Some studies have also shown that the use of MMI can be less effective than written instructions when learners have any prior knowledge of the material. Known as the expertise reversal effect theory (Kalyuga, 2003), the idea behind the theory is that experts do not need the amount of learning-assistance provided by MMI because they already have the schema that MMI develops in learners. In these cases, the theory claims, it is better to provide only basic instructions such as those found in traditional written instructions. Too much guidance for experts, or too little guidance for novices, both result in increased extraneous cognitive load.

Measuring cognitive load is difficult, but possible. Some researchers measure it through mental load, mental effort, and performance; others use analytical methods to estimate cognitive load's effects (Paas, "Cognitive Measurement," 2003). Despite difficulties in measuring cognitive load, researchers are using what they have learned to improve the management of cognitive load both in MMI and traditional instruction methods. Five major types of cognitive overload have been identified: overloading the visual channel; overloading the auditory and visual channels; overloading one or both channels with essential or incidental demands caused by extraneous material; overloading one or both channels with essential or incidental demands caused by confusing presentation of material; and overloading one or both channels with essential demands or representational holding (Mayer, 2003). Each problem has its own unique solutions that can aid in decreasing cognitive load.

Instructions, multimedia or not, are written to teach a learner a specific task. Instructional designers must consider not only the information contained in the instructions, but how learners will relate to it. Designers should remember that too much instruction can result in learning that is just as inefficient as the learning that occurs from too little instruction; they must also work to measure and reduce cognitive load created by their instructions and promote efficient learning.

Relevancy of IDT and CLT to the Thesis Project

Instructional Design Theory and Cognitive Load Theory were relevant to the thesis project because part of the project was to write a set of instructions for the video game that my experiment subjects would play. In writing these instructions, I was forced to consider how I would design my instructions, and the amount of information that I should include in them. If I included too much information in the instructions, my participants would be overwhelmed by them and perform poorly in the testing phase; if there was not enough information included in the instructions, poor performance would again be the result. I also needed to be sure I considered the five characteristics of instructional design so that testing participants would use the instructions I provided them, rather than another method of learning such as trial and error.

The instructions I wrote allowed testing participants to analyze both the task assigned and the tools they were given to complete the task. The instructions explained the design of the task and the design behind the XBOX 360 controller they used in the experiment. The instructions developed learner abilities by breaking the controller's functions down firstly by which hand controlled them, and secondly by which button caused them to occur. The instructions then explained when and why each function should be used. Finally, the instructions addressed evaluation through the difficulty-recommendation level.

By considering both IDT and CLT while completing the thesis project, I was able to write instructions that were more effective at teaching experiment participants the task they were to complete. Researching IDT and CLT also allowed me to understand why instructions are written in the ways that they are, and why I need to consider all the needs of my learners when creating instructional documents.

Methodology

Methodology for the thesis project consisted of six main parts. The first part was preliminary research and the sub-topic papers over cognitive load theory, instructional design theory, and data collection theory. This consisted of locating between five and ten articles relating to each sub-topic; after that, I read each article and composed a two-page minimum paper discussing the topic and its relation to the thesis project. The papers were submitted to my advisor, Dr. Joey Brown, as rough drafts. Dr. Brown would read each composition and return it with her comments during conferences that occurred after the submission of each paper. Each paper would be revised to address her concerns with the original draft. After the completion of the three sub-topic papers, the project moved to the second stage.

The second stage of the project was the part in which the written instructions for my experimentation were created. To write the instructions, I played through the multimedia tutorial that the experiment would use. While playing the tutorial, I noted the main processes that the tutorial aimed at teaching. After repeating this step several times, I decided on the information that should be included in the written instructions. Following that decision, I wrote my instructions using Microsoft Word 2007. Photograph 1 in the section **Other Documents** at the end of this document is an image of the written instructions used in my thesis project. Once the written instructions were completed, I moved to the third stage of the project.

The third stage of the project was to create my participant-screening survey. In creating the survey, I asked respondents to identify their comfort with written instructions, multimedia tutorials, and their preferred method of learning (between written instructions and multimedia tutorials). I also asked them to indicate how often they played video games on a scale of one to ten (with one being rarely or never and ten being frequently or daily). Respondents were also asked to identify the types of video games they played, if any. Respondents were asked if they had played *MW2* or any game in the *Call of Duty* series on Microsoft's XBOX 360, and if they were willing to participate in further experimentation for my thesis project. Photograph 2 in the section **Other Documents** at the end of this document is an image of the participant-screening survey. Respondents who answered that they were willing to participate further, but who had not played *MW2* or any *Call of Duty* game on the XBOX 360 were chosen to participate in the testing stage of the project.

The fourth stage of my project was the testing stage. For this stage, I e-mailed the 30 survey-respondents who indicated their willingness to participate in further testing in order to set up a time for the testing. Of the 30 participants e-mailed, ten responded with a time at which they could participate. Those ten were divided into two groups of five. One group was given the written instructions and then asked to play the level *S.S.D.D.* on *MW2* using Microsoft's XBOX 360. An Emerson 19" LCD television was used in playing the level. After reading the instructions two times, each participant played the level three times. The participants' scores after each attempt at the level were recorded for later comparison to the second test group. The second group was asked to play through the tutorial included in the level *S.S.D.D.* and then complete the level three times using the same equipment as the written instructions group. After each attempt, the participants' scores were recorded for later comparison against the scores of the written instructions group during the fifth stage.

The fifth stage of my project was the evaluation stage. Each group's scores were converted into numerical values. After that was done, the average score for the following categories was calculated: Completed Time, Enemies Killed, Civilians Killed, Accuracy (as a percentage of shots fired), Accuracy Bonus, Enemies Missed Penalty, Civilians Killed Penalty, Adjusted Completed Time, and Recommended Difficulty. The averaged scores for each group were compared to decide the more effective method of instruction. The results and discussion are contained in the sixth stage of the project.

The sixth stage of my thesis project is the final project paper. The paper compares and discusses the effectiveness of written instructions and multimedia tutorials as they relate to the Infinity Ward video game *Call of Duty: Modern Warfare 2*. It explains my proposed thesis project, changes that occurred during the lifecycle of the project, how CLT and IDT affect instruction and why they are important, the methodology for the project, how I collected data in my experiment and why I used that method. It concludes with the results of my experimentation and a recommendation of the most effective instruction method based on my results.

Data Collection

Data collection can validate claims. It allows investigators to examine specific variables in controlled manners directly applicable the claims he or she makes. For the senior thesis project, I collected data using experimentation and participant surveys.

The thesis project required experimentation or observation (Stattrek, 2011; Some, 2011). Observation requires that the experimenter not involve himself or herself directly with participants; no interaction between the person conducting the observations and the subject is allowed. Because my project required the collection of several types of data, I decided that observation was not a valid technique for data collection for the project. I needed to administer surveys that examined participant concerns and opinions on written instructions and multimedia instructions; I also needed the ability to divide my participants into multiple testing groups. Because of the project's requirements, I chose experimentation over observation.

Experimentation is similar to observation, except it allows for a controlled study in which the researcher has the ability to manage participants in order to better understand causal relationships. The researcher controls subjects' assignments to groups, and the treatments that each group receives. Experimentation allowed me to choose test participants from my survey group, rather than using all respondents for analysis.

My thesis project required that I locate a sample group for further testing. To do this, I was faced with the choice of using interviews or a survey to locate potential sample group members (Owens, 2005). Because interviews require individual meetings with all potential candidates for testing, I decided that they would be too time-consuming for the results they would provide. Surveys were the better option for my thesis project for several reasons.

By using surveys as a preliminary screen for sample group members, I was able to collect standardized information from all respondents. I was able to collect the information quickly and efficiently by distributing the surveys to members of the MSSU Honors Program (through their Honors Office mailboxes), to members of Dr. Joey Brown's classes (Dr. Brown administered the survey in my absence), and to members of Mr. Michael Rodgers's Advanced Essay Writing class (in which I am a student). The time required to administer the survey to approximately 100 individuals and then analyze the standardized information was likely much less than the amount of time that would have been required to individually interview each person. The surveys also allowed me to easily identify potential sample group members for testing based on their responses to the questions "Have you ever played *Call of Duty Modern Warfare 2* on XBOX 360?," "Have you ever played any game in the *Call of Duty* series on XBOX 360?," and "Are you willing to participate in an experiment comparing the effectiveness of written instructions and multimedia tutorials?" These surveys, as well as the experimentation, provided the results for my thesis project.

Results

The thesis project began with the belief that my experimentation would prove that multimedia instructions were more effective than written instructions. This would be a valuable thing to know as a technical writer, because it would demonstrate a weakness in my field. Knowing this weakness existed, I could work to address it and consider its implications in my future works. However, the results of my experimentation demonstrated that my original theory was not entirely correct. Though individual scores for multimedia instructions were higher than individual scores for written instructions, the group that used written instructions scored better overall. Testing participants were scored based on the time they required to complete the level in seconds; how many "enemy targets" they knocked down; how many "civilian" targets they knocked down; their accuracy as a percentage of the shots that hit targets (either "enemies" or "civilians") compared to the number of shots fired; a final time in seconds that was adjusted according to their accuracy, enemies hit, and civilians hit; and the suggested difficulty on a scale of one to five. If a participant was unable to complete the course within a given amount of time, the game would end the test automatically. In cases where the participant did not complete the level, their scores were counted as zeroes for time, accuracy, final time, and difficulty.

The average time required in trials by participants using written instructions was 64.07 seconds; they knocked down an average of 17.67 of 24 enemy targets in each trial; they averaged one civilian casualty per trial; average accuracy was 29.13%; the average adjusted final time was 69.66 seconds; the average recommended difficulty on a scale of one to five was 1.60. The average recommended difficulty was higher for the group using written instructions than for the group using multimedia instructions. Table 1 on the following page displays the individual and averaged scores for the group that was tested using written instructions.

Individual and Average Scores using Written Instructions						
Trial Number	**Time**	**Enemies Killed**	**Civilians Killed**	**Accuracy**	**Final Time**	**Difficulty**
1		7.00	1.00			0
2	123.00	16.00	1.00	57.00	138.10	1
3	86.80	11.00	2.00	17.00	115.90	1
4		11.00	1.00			0
5	75.85	23.00	0.00	82.00	73.75	3
6	60.05	24.00	1.00	109.00	56.55	3
7		18.00	1.00			0
8	71.35	24.00	0.00	38.00	69.45	3
9	61.16	24.00	0.00	39.00	59.15	3
10		7.00	1.00			0
11	142.00	14.00	2.00	14.00	165.30	1
12	109.80	17.00	2.00	12.00	127.20	1
13	101.65	24.00	1.00	15.00	102.85	2
14	60.70	22.00	1.00	29.00	65.20	3
15	68.70	23.00	1.00	25.00	71.40	3
TOTALS	961.06	265.00	15.00	437.00	1044.85	24.00
AVERAGES	64.07	17.67	1.00	29.13	69.66	1.60

Table 1: Individual and Average Scores for Participants using Written Instructions

Test participants using multimedia instructions were scored on the same criteria as those using written instructions. Their average scores were better individually, but the average difficulty recommendation was .27 lower for the group (at 1.33 on a scale of one to five). Other scores for the group were as follows: average time, 62.42 seconds; average enemies killed per trial, 19.33 out of 24; average civilians knocked down per trial, .67; average accuracy, 31.00%; average adjusted time, 62.32 seconds, as demonstrated in Table 2 on the following page.

Individual and Average Scores using Multimedia Instructions						
Trial Number	**Time**	**Enemies Killed**	**Civilians Killed**	**Accuracy**	**Final Time**	**Difficulty**
1		8.00	1.00			0
2		18.00	0.00			0
3	157.80	20.00	1.00	77.00	163.90	2
4	76.90	24.00	2.00	50.00	78.40	2
5	64.00	24.00	1.00	60.00	63.00	3
6	57.50	24.00	0.00	65.00	54.20	3
7		11.00	1.00			0
8	132.55	24.00	0.00	42.00	130.45	2
9	110.55	24.00	0.00	51.00	107.95	2
10		8.00	1.00			0
11		24.00	0.00			0
12	116.95	24.00	1.00	41.00	116.85	2
13		9.00	0.00			0
14	117.40	24.00	1.00	43.00	117.20	2
15	102.60	24.00	1.00	36.00	102.80	2
TOTALS	936.25	290.00	10.00	465.00	934.75	20.00
AVERAGES	62.42	19.33	0.67	31.00	62.32	1.33

Table 2: Individual and Average Scores for Participants using Multimedia Instructions

Despite higher individual scores, the lower average suggested difficulty score would seem to suggest that the written instructions were, at least in this experiment, more effective than the multimedia tutorial, as shown in Table 3 following this paragraph. This result is somewhat misleading because in individual trials where the participants completed the level, those using the multimedia tutorial received better scores than those using the written instructions. However, according to the results, it was more likely that someone using the multimedia instructions would not complete the tutorial; those using written instructions completed the trial 11 of 15 times, compared to 9 of 15 for those using multimedia instructions. This resulted in a zero score for the difficulty recommendation, lowering the average recommended difficulty significantly. Another reason these results might be misleading are learners' comfort levels with methods of instruction.

Average Scores						
Learning Method	**Time**	**Enemies Killed**	**Civilians Killed**	**Accuracy**	**Final Time**	**Difficulty**
Written Instructions	64.07	17.67	1	29.13	69.66	1.6
Multimedia Instructions	62.42	19.33	0.67	31	62.32	1.33

Table 3: Average Scores for Both Instructional Methods

The participant-screening survey answered by approximately 100 people asked respondents to identify their comfort levels with written instructions, multimedia instructions, and their preferred method of learning between the two. Comfort was rated on a scale of one to ten, with one being uncomfortable and ten being comfortable. Instructional preference was indicated on a sliding scale, with one indicating written instructions and ten indicating multimedia instructions.

Instructional Comfort and Preference on a Scale of 1 - 10			
Group	**Written Instructions**	**Multimedia Instructions**	**Preferred Instructional Type**
Testing Participants	8.8	8.7	5.3
Survey Respondents	8.2	8.4	5.4
	with 1 Representing Uncomfortable and 10 Representing Comfortable	with 1 Representing Uncomfortable and 10 Representing Comfortable	with 1 Representing Written Instructions and 10 Representing Multimedia Instructions

Table 4: Instructional Comfort and Preference

The average comfort with written instructions for all survey respondents was 8.2 on a scale of one to ten; for testing participants it was 8.8 on the same scale. All survey respondents indicated an average comfort level of 8.4 for multimedia instructions, while testing participants indicated a comfort level of 8.7. On a scale of one to ten, where one represented written instructions and ten represented multimedia instructions, the average response for all survey respondents was 5.4; for testing participants the response was 5.3. These responses indicated that survey respondents and testing participants alike felt more confident in their ability to learn a given task from a multimedia tutorial than from written instructions.

The testing participants on average felt more comfortable with written instructions, but would prefer multimedia instructions for learning new tasks. The average responses for all survey respondents indicated that they were more comfortable with multimedia instructions. The perceived comfort level with instructions and preferred method of instruction played a minor role in my final decision as to which style of instruction was more effective.

Recommendation and Discussion

Based on the findings of my thesis project, I recommend the use of multimedia instructions for teaching the controls to *MW2* because learners feel more comfortable on average when using multimedia instructions, and because the experimentation results demonstrated only a miniscule improvement when participants used written instructions. In individual trials where the test-participant completed the trial, scores were higher than in individual trials completed by participants using written instructions. It was only when uncompleted trials were included in the averages that written instructions appeared more effective than multimedia instructions. Because four of uncompleted trials for multimedia instructions were the results of two participants, this likely skewed the results against multimedia instructions. If either, or both, of those participants had been assigned to the written instruction group instead of the multimedia instruction group, results would likely have been skewed in favor of multimedia instructions.

Another reason for my recommendation of multimedia instructions instead of written instructions is the sample size used in testing the effectiveness of the two types of instruction. In the larger survey response group, the comfort level and preference for multimedia instructions was higher than the comfort level and preference for written instructions. My belief is that if a larger sample size was used to test the effectiveness of the instructional methods, the results would be a more successful multimedia instruction group. This also would have prevented (or at least helped to prevent) the skewing seen by less-than-average (compared to other participants) performance by a few individuals in one test group.

The Visual Nature of Technical Writing

The written instructions used in my thesis project were just that: written instructions, made only of words. However, instructions often use more than just words to convey their messages. They can also use visuals, known as icons, to help express their meanings more effectively. These icons, like the written words, are meant to be "read."

In dual-mode instructions written words explain what should be done or should happen and images show the situation or item as it is at that moment in time (Handa, 2004). Dual-mode instructions can be written in less-complex styles than single-mode instructions. The icons can represent ideas, objects to be manipulated, position, or completion while the written words support the icons by explaining the step or processes (Handa, 2004). The idea of combining visuals with words is by no means a new one.

From the imagery of fables, to the descriptions of landscape in Virgil's poetry, to emblem books in during the Renaissance, the visual has long been entwined with the verbal (Handa, 2004). The reason for this, according to researchers, is that images are easier to remember than words. An image is a sensible object, where words are abstract; the image is concrete, while the word is only an idea. Instructors have long known and implemented iconography in their written instructions, but the relationships between the visual and verbal are changing more rapidly than ever because of modern developments in technology and media.

Currently, icons and text are combined by people who have not been instructed in the tandem use of the two items. Despite several decades' recognition that text and visuals need to be taught together, visual and written communication are rarely taught in the same class. Because of this, people who learn one type of communication rarely learn the other type. Another problem with the connected nature of the two types of communication is that visual technology has experienced rapid growth in the past 25 years, while visual communication has remained more or less the same. That growth makes it very difficult to determine specifically how the visual and written work together. This visual nature of technical communication is important to my project for two reasons.

The first reason is that while I could have, and in fact wanted to, examine how the visual and written work together, the research in the field is too slow for this type of project. Secondly, what little research that has happened is not usually presented at an undergraduate level; the research is too complex for the undergraduate audience like me. Because of the complexity and lack of research in combining visual and written communication, I chose not to include pictures in my written instructions, though doing so was an option. Also, both written and visual communication involve the ability to both read or scan the material, so while I did not include any visuals, the written document as a whole does share many of the characteristics common to visuals, such as being read from top to bottom, being read from left to right, and emphatic positioning of elements.

Conclusions

Though the results of my experimentation suggested that written instructions were more effective, I maintain that multimedia instructions are the better of the two methods examined when teaching the controls to *Modern Warfare 2*. The results of my experimentation were skewed against multimedia instructions because of the less-than-ideal sample sizes of only five people per test group. The 100-person survey indicated that respondents were more comfortable with and preferred multimedia instructions, further strengthening my belief that it is the better of the two methods, because learners are more comfortable with it.

Learners may be more comfortable with multimedia instructions because they do a better job of addressing instructional design theory and cognitive load theory for larger audiences. Regardless, my thesis project taught me that instructional design theory and cognitive load theory are two things I should consider for future instructional work. If I cannot meet the needs of my learners, my documents will not be successful, and I will not be a successful writer. Besides this insight into technical writing, the project had another advantage.

Completing my thesis project gave me the chance to do original research much like what I will be required to do as a technical writer in the future. Technical writers perform a variety of tasks, including researching and recommending options to their employers. This project provided the opportunity to do something similar, and gave me the chance to see how I felt about doing that sort of technical writing. In short, I did enjoy the work required by this project, and I feel like the thesis project was a valuable part of my college experience. It was interesting, and the sense of accomplishment I felt upon its completion was very rewarding.

Other Documents

Modern Warfare 2 Controller and Testing Instructions
by
Josh Klugh

Summary
Modern Warfare 2 is controlled using the XBOX 360 controller. These instructions explain the layout of the controller and the function of the controller's buttons. These instructions also provide direction for Josh Klugh's thesis experimentation.

Controller Layout
The XBOX 360 controller is designed to be held using two hands. The left hand is used to manipulate the left trigger, left bumper, directional pad, and left joystick. The right hand manipulates the right joystick, multi-function buttons, right bumper, and right trigger.

Left Hand Controls

Left Joystick – Movement
The left joystick controls player movement. Use the left joystick to move your character through the map. Pressing the stick forward makes you walk forward; pulling it backwards makes you move backward. Push the joystick left or right to move those directions. The joystick can also be depressed like a normal button. Depress the joystick to make your character run. You should use the left joystick to move towards objectives in the game.

Directional Pad – Special Weapons
The directional pad is used for special weapons. Press left, right, or down to select the weapon assigned to that slot. You will not use the directional pad in this testing.

Left Trigger – Aiming
The left trigger controls the aim of your weapon. Pull and hold the left trigger to aim down the sights of the weapon. Pull and release the trigger quickly to snap to new targets. You should use the left trigger to accurately target objectives in the game.

Left Bumper – Special Grenades
The left bumper allows you to use special grenades. Pull the left bumper to use flash, smoke, or stun grenades. You will not use the left bumper in this testing.

Right Hand Controls

Right Joystick – Camera and Melee
The right joystick controls the camera. Push the right joystick forward to look up. Pull the joystick back to look down. Moving the stick left or right causes the camera to look left or right respectively. The right joystick also controls the melee action. Depress the right joystick to melee. You should use the right joystick to control the general direction in which your character looks, or to "knife" targets that are close to you.

Multi-function Buttons – Pick up Weapons, Reload, Crouch/Lay down, Jump
The multi-function buttons are A, B, X, and Y. Push the A button to jump. Press the B button to crouch. Hold the B button to lie down. Press the X button to reload. Hold the X button near fallen weapons to pick them up. Push the Y button to switch between the primary and secondary weapons. You should use the multi-function buttons at your discretion; it is suggested that you use them when your primary weapon is out of ammo or you are being fired at by enemy targets.

Right Bumper – Grenades
The right bumper allows you to throw grenades. Push the bumper to throw fragmentation or semtex grenades. You will not use the right bumper in this testing.

Right Trigger – Fire
The right trigger fires the weapon. Pull and release the trigger once to fire single shots or semi-automatic weapons. Pull and hold the trigger to continuously fire automatic weapons.

Testing
Once you are comfortable with the controls for the game, play the difficulty-recommendation level *S.S.D.D.* three times. Pause after each attempt so that your scores can be recorded for evaluation.

Photograph 1: *MW2* Instructions

The following survey is being conducted as a part of Josh Klugh's senior thesis research. Participation in the survey is voluntary. Please do not participate if you are not age 18 or older. Please answer the questions to the best of your abilities. All responses will be kept confidential. If you have questions or comments about the survey, contact Josh Klugh at j.klugh@gmail.com. When finished, return your survey to Josh Klugh's Honors mailbox (if you are in the Honors Program) or to the professor of the class in which you received it. Responses should be returned by Friday, March 18, 2011.

____

Last Name | First Name | Middle Initial

For questions 1 and 2, select a response between 1 (Uncomfortable) and 10 (Very Comfortable).

1. How comfortable are you using written instructions to learn a task or procedure?

Uncomfortable 1 2 3 4 5 6 7 8 9 10 Very Comfortable

2. How comfortable are you using multimedia tutorials (such as a computerized lesson or hands-on lesson) to learn a task or procedure?

Uncomfortable 1 2 3 4 5 6 7 8 9 10 Very Comfortable

3. Select a response between 1 (Written Instructions) and 10 (Multimedia Tutorials) that best identifies your preferred method of learning a task or procedure.

Written Instructions 1 2 3 4 5 6 7 8 9 10 Multimedia Tutorials

4. On a scale of 1 (Rarely/Never) to 10 (Very Often/Daily), indentify how often you play videogames.

Rarely/Never 1 2 3 4 5 6 7 8 9 10 Very Often/Daily

5. If you play video games, identify (by circling) the genre of video games you play.

RPG First-Person Shooter Third-person Shooter Action/Adventure

Sports Racing Other

6. If you answered Other to question 5, please describe the genre of game you play.

____

7. Have you ever played Modern Warfare 2 for XBOX 360?

Yes No

8. Have you played any game in the Call of Duty series on XBOX 360?

Yes No

9. Are you willing to participate in an experiment comparing the effectiveness of written instructions and multimedia tutorials?

Yes No

10. If you are willing to participate further in Josh Klugh's senior thesis, please provide the following information.

E-Mail Address: ______________________________

Phone Number: ______________________________

Thank you for your participation in this survey. If you stated that you were willing to participate further, you will be contracted about taking part in the second stage of Josh Klugh's thesis.

Photograph 2: Participant-screening Survey

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