

# Learning From Interactive Videos and Video Games

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**Abstract**— In today’s technologically rich culture, research is diving deeper into technology’s effect on children. In an attempt to observe differences in media source (video and video game) impact on children, twenty 4 to 8-year-old children ( $M=5.8$ ,  $SD=1.24$ ), 9 males and 11 females were exposed to “Dora, the Explorer,” both as a video game and a video. They viewed a media source, then were tested on transfer tasks and memory ability, and then repeated using the second media source. Two separate  $2 \times 2 \times 2$  ANOVA’s were examined, utilizing media sources with both transfer type and question type respectively. Differences were found to exist based upon both gender and media source, with gender impacting transfer tasks, and media source impacting memory ability.

**Index Terms**—Children, Game, Problem-solving, TV.

## I. INTRODUCTION

In an attempt to observe transfer memory differences that exist between media sources (video and video game), to-date, twenty 4 to 8-year-old children ( $M=5.8$ ,  $SD=1.24$ ) have been asked to participate in a pilot study. Data has been collected from 9 males and 11 females. Current participants range in ethnicity, with a distribution of 35% Caucasian, 25% Hispanic, 25% African American, and 15% representing other, or multiple, ethnicities.

The video used in this study was contained as a bonus feature on a children’s DVD entitled “Dora the Explorer: World Adventure.” The bonus feature utilized was “Dora the Explorer: Journey to the Purple Planet,” and a *Game Cube*™ video game of the same name as the bonus video. “Dora the Explorer” has an ESRB rating of early child (EC), age 3 and older. During the video game, players, with the help of Map, control Dora, in order to travel through six levels filled with visual excitement and mental challenges. Players are required to help Dora collect the necessary gems to power their rocket-ship, avoid meteors, and collect jet packs, with the goal of helping Dora, Boots, and their new friends travel home to the Purple Planet. Along the way, Dora and Boots face many challenges, which include a character called Swiper the Fox, a villain who attempts to steal previously collected items from Dora and Boots. The DVD video presents the entire videogame story in a shortened version, touching on the key points of the story, such as finding the rocket-ship, avoiding the meteors, and stopping Swiper the Fox from stealing necessary items. Both the DVD and the videogame can be

considered interactive media, because the video encourages participation by the player/viewer by asking questions of them, and then pausing for an answer, later answering with the assumption the player/viewer provided the correct response.

Children participating in this study were counterbalanced in the order in which they experienced the video and video game. The entire process occurred over a sixty-minute period, in which the child experienced both media sources for approximately 25 minutes, and then were asked a series of questions, and to perform two tasks. During this question phase children were asked four story reminder questions, three of which were used to comprise a structural memory score. They completed an analogical and direct transfer task designed to access learning ability. The final portion involved five memory questions, three of which were used to observe detail memory, and two involving language acquisition. The detail memory questions were the same for both media sources, as the stories in the video and videogame were so similar in plot and detail.

To access children’s learning ability, the transfer questions were given a value of 1 if the child could solve the problem using a solution presented in the video and the video game, and a zero if they were unable to answer correctly. There were no significant differences found for age in children’s transfer ability or memory performance. A  $2 \times 2 \times 2$  ANOVA was utilized, with media type (video vs. video game) and transfer type (analogical vs. direct) as the within-subjects parameters, and gender as the between-subjects parameter. There was found to be a main effect of media type ( $F[1,17] = 18.282$ ,  $p = .001$ ), and gender ( $F[1,17] = 11.693$ ,  $p = .004$ ), wherein children performed better on videogames, and females performed best overall. Additionally, there was a media x transfer x gender three-way interaction ( $F[1,17] = 6.824$ ,  $p = .018$ ). A second  $2 \times 2 \times 2$  ANOVA was conducted, observing content memory replacing transfer type with memory type (Detail vs. Structural). Again, a main effect of gender was found ( $F[1,17] = 4.280$ ,  $p = .054$ ), with the finding that females performed better. In addition, question type x media ( $F[1,17] = 5.639$ ,  $p = .03$ ), and question type x gender ( $F[1,17] = 9.046$ ,  $p = .008$ ) two-way interactions were found. Media type only significantly differed in the DVD condition, wherein children remembered detail questions over structural. Gender effects were found, in that males and females performed equally well on detail questions, but females performed significantly better on structural questions.

In observing whether transfer differences exist between media sources, it was found that differences are present, and exist as media source and gender differences. It was also discovered that differences exist in memory, based on task and gender.