

Running head: VIEW FROM THE VIRTUAL POCKET

Pepperdine University

Graduate School of Education and Psychology

VIEW FROM THE VIRTUAL POCKET:
USING VIRTUAL SIMULATION AND VIDEO GAME TECHNOLOGY TO ASSESS
THE SITUATION AWARENESS AND DECISION MAKING OF NCAA
QUARTERBACKS

A dissertation proposal submitted in partial satisfaction
of the requirements for the degree of
Doctor of Education in Learning Technologies

by

Burnie Bristow

April, 2011

Linda Polin, Ph.D. – Dissertation Chairperson

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DOCTOR OF EDUCATION

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PREVIEW

PREVIEW

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PREVIEW

DEDICATION

Dear God,

Thank you for breathing life into the heart and soul of a virtuous woman.
My Mom was my roadmap to YOU!

To: My Mom
Bertha L. Bristow
- My First and Greatest Teacher -

Your unconditional love, nurturing spirit and unwavering faith in my dreams and aspirations propelled me to grow into the crown of scholarship, manly deeds, and love for all mankind.

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“Happy is the man who...gains understanding.” Pr 3:13

As I close the book on this professional milestone and begin the next phase of my ideal life, I’m compelled to pay homage to scores of individuals that have impacted my life well beyond the completion of this manuscript. Please know that you will be receiving a personalized expression of my heartfelt gratitude.

Thus, I will reserve this section to acknowledge the unique contributions that fueled the development and completion of *View from the Virtual Pocket*.

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Up Close and Personal

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Thanks for letting me know we have a Guardian Angel!

To: My Brother: Bradford L. Bristow
Thanks for showing me the Genesis of a purposeful life!

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My love for you is indelibly etched in the Hall of Fame of my Heart.

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To the City of Paterson, New Jersey: If you call, I will answer.

To my children: With Love!

To countless family, friends and well wishers...My love, admiration and respect for you extend beyond the pages of this manuscript.

PREVIEW

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Scholarship Recipient

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Passaic County's First National Board Certified Teacher

Featured in the 9th Edition of "*Who's Who Among America's Teachers*"

Successfully certified, mentored and nominated three Bill and Melinda Gates Scholars

NJ Senate and General Assembly Citation: "Unsung Hero Award"

Finalist for United States Navy Sailor of the Year
Naval Air Station, Jacksonville, Florida

Navy Good Conduct Medal and Navy Achievement Medal

Member of the last All Passaic Valley Conference Football Team

ABSTRACT

View from the Virtual Pocket is a proof of concept study in which a theoretical proposition about situation awareness in time constrained decision making is wedded to the affordances of a computer based simulation to ascertain if the real world decision making in the pocket of an NCAA quarterback can be modeled successfully for simulation based learning.

The researcher used the Situation Awareness Global Assessment Technique (SAGAT) for the purposes of (a) analyzing the situation awareness requirements for expert decision making and (b) to empirically assess the viability of using a computer based football simulator as a SAGAT simulation tool.

The highlight of this study is a Goal Directed Task Analysis developed in conjunction with some of the most recognized names in professional and collegiate football. The results of the (GDTA), a form of cognitive task analysis, defined the information requirements for expert quarterbacking and shed light on the enormous cognitive demands placed on the quarterback.

The researcher was able to create, categorize and program SAGAT queries from the Goal Directed Task Analysis into an innovative virtual reality simulator called the PlayAction Simulator PC. Once the queries were programmed and the plays were published, the Researcher evaluated the simulator's ability to (a) stop a simulated repetition at random points to ask probing questions aimed at evaluating a quarterback's SA and (b) create the ecological validity required to extapolate the informing needed to measure situation awarness in the domain of the quarterback.

The results of this inquiry (a) identified the goals of the quarterback, the decisions the quarterback has to make to achieve those goals and the information the quarterback needs to know in order to make accurate decisions, (b) validated the ability of the interactive virtual simulator to used as a SAGAT Simulation tool in the assessment of the quarterback's situation awareness.

Additionally, the Goal Directed Task Analysis led to the creation of the Decision Making Model 4 QB's. The model, a hybrid of the Endsley (2000a; 2000b) SA Model and the Klein (1998) RPD Model, represents a viable and testable description of the situation assessment process that quarterbacks use to formulate an aerial hypothesis. Inherent in this new model is a proposition about the role of unconscious competence in the optimization of serially generated options.

Chapter 1



Figure 1. Virtual football trainer. Reprinted from UM-VRL: Virtual Football Trainer, n.d. Retrieved October 9, 2009, from <http://www-vrl.umich.edu/project/football/index.html>. Copyright 2008 by Klaus-Peter Beier. Reprinted with permission.

“It might not be the real thing, but the Virtual Football Trainer comes pretty darn close,” says the U-M player who inspired No. 7 to take the simulated snaps -- former Wolverine quarterback Tom Brady, who saw an early version of the program in 1999. (Hoffman, 2001, p. 16)

Introduction

In the summer of 1999, engineers at the University of Michigan put a little-known back-up quarterback named Tom Brady in a computer automated virtual environment that housed a unique full-immersion virtual football trainer designed to improve the decision making ability of NCAA quarterbacks. Once inside the CAVE (Computer Animated Virtual Environment), Brady became fully immersed in an artificial, three-dimensional football world that was completely generated by a computer (Beier, 2001). Wearing lightweight stereo glasses, he was able to take snaps and read the reactions of the computer-generated avatars.

During the fall season of 1999, Brady was named team captain and his steady play on the field was rewarded by being named All-Big Ten (Honorable Mention). He capped off his stellar season with an overtime victory over Alabama in the Orange Bowl. In that game, Brady threw for 369 yards and four touchdowns. But few NFL scouts took notice.

Upon the completion of his collegiate career, Brady was not selected until the sixth round of the NFL draft. He was the 199th player selected, and the seventh quarterback selected. He was drafted behind the likes of Giovanni Carmazzi and Sperguson Wynn! It goes without saying that Brady did little to impress NFL scouts with his ability, and displayed little potential to be a quarterback in the NFL. He began his rookie season as the number four quarterback on the New England Patriots' roster.

But, almost a decade after his view from the virtual pocket, Brady is widely regarded as one of the best quarterbacks of his era. He has played in four Super Bowls, winning three of them (XXXVI, XXXVIII, XXXIX). He has won two Super Bowl MVP awards (XXXVI and XXXVIII), has been invited to four Pro Bowls, and holds the NFL record for most touchdown passes in a single season!

Watching Brady shred NCAA and NFL defenses, one can't help but wonder about the connection between his uncanny decision making ability and the time he spent in the University of Michigan Computer Animated Virtual Environment (CAVE). How did Tom Brady -- operating in a high-stakes adversarial environment, under extreme time constraints, and on the biggest stage in professional sports, the Super Bowl -- display such unparalleled examples of expert decision making and performance? Was the virtual football trainer his secret weapon?

Context of the Study

To answer this question, this study used a Goal Directed Task Analysis, developed in conjunction with expert coaches and quarterbacks, to identify what great quarterbacks need to know to make great decisions. Armed with “what” they need to know, the researcher programmed a virtual football trainer, the PlayAction PC, in an attempt to create an ecologically valid environment to assess the quarterback’s situation awareness. The researcher sought empirical evidence of how expert quarterbacks read and recognize complex NCAA defenses and parlay that knowledge into decisive and appropriate action. What are the situation awareness (hereafter, SA) requirements for the exemplary decision making displayed by NCAA record setting quarterbacks like David Klinger, Colt Brennen and Heisman Trophy winner Andre Ware? What do great quarterbacks know and see that average quarterbacks miss, and how do we design and use immersive virtual reality simulators as a tool to assess this situation awareness expertise or lack thereof?

The researcher’s secret weapon in this endeavor is the aforementioned virtual reality football trainer called the PlayAction Simulator PC, developed by XOS Digital, a national leader in the sports technology industry. “Powered by EA SPORTS, ...athletes can now practice using their teams’ customized plays against realistic scout defenses in a three-dimensional, video-game-simulated environment. A quarterback using this new tool can practice reading a defense, picking up blitzes and making quick decisions on where to throw the ball, all based on the tendencies of the team he is going to play the upcoming weekend” (BusinessWire, 2007, p. 2).