

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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TABLE OF CONTENTS

	Page
LIST OF TABLES	viii
LIST OF FIGURES	ix
DEDICATION	xii
ACKNOWLEDGEMENTS	xiii
VITA	xvii
ABSTRACT	xix
Chapter 1	1
Introduction	1
Context of the Study	3
Situation Awareness + Decision Making = Expert Performance?	4
Recognition Primed Decision Model (RPD)	5
Situation Awareness (SA) in Recognition Primed Decision Making (RPD)	7
Significance of the Study	8
Designing systems to enhance SA in sport	9
A prescriptive theory of SA	10
Situated theory of learning	10
Objectively measuring SA in sport	10
Purpose of the Study	11
Research Questions	12
Chapter 2	13
Introduction and Theoretical Framework	13
RPD model in the domain of sports	13
RPD in adversarial conditions	21
Situation awareness and the RPD model	31
Endsley's situation awareness model	32
Level 1 SA: Perception	32
Level 2 SA: Comprehension	33
Level 3 SA: Projection	34
The importance of time in achieving SA	34
Expertise and situation awareness	35
Schemata and mental models in recognition primed decision making	36
Reconciling ecological psychology with Endsley's SA model	37
Pattern recognition	39

	Page
Designing Virtual Simulation to Enhance SA in Sport	41
Training and situation awareness in sport.....	44
Measuring situation awareness in sport	46
Summary.....	47
Chapter 3.....	49
Research Questions	49
Research design	50
Limitations of the method.....	53
Overview of Study Phases	54
Semi-structured interviews	54
Goal directed task analysis.....	55
Situation awareness global assessment questions.....	56
Programming the virtual simulator.....	57
PlayAction Simulator PC as a SAGAT simulator tool.....	57
Phase I Methodology: Conducting Interviews.....	58
Recruitment and selection of participants.....	58
Participants in the study.....	60
Data collection and review procedures.....	61
Conducting the interviews	61
Creating a narrative of the interviews.....	63
Coding the interviews	64
Definitions of interview categorization chart elements	64
Phase II Methodology: Developing the Goal Directed Task Analysis	66
Step 1: Develop the goal hierarchy.....	66
Step 2: Identify decisions the quarterback must make.....	67
Step 3: List the information needs (SA) of the quarterback	68
Phase III Methodology: Developing the Situation Awareness Global Assessment (SAGAT) Questions.....	68
Phase IV Methodology: Programming SAGAT Probes into the PlayAction Simulator PC	69
Step 1: Pilot demonstration of the product	70
Step 2: Selecting the play.....	71
Step 3: Diagramming the play	74
Step 4: Publishing the plays.....	75
Proof of concept.....	75
Phase V Methodology: Testing PlayAction Simulator PC as a SAGAT Simulation Tool	75
View from the virtual pocket methods	76

	Page
Chapter 4	78
Overview of Results.....	78
Results in Answer to Research Question 1	79
Phase I: Results of semi-structured interviews	79
Coding the interviews	80
Phase II: Results of the Goal Directed Task Analysis	85
Step 1: Develop the goal hierarchy.....	86
Goal 1.0, attacking the defense	86
Sub-goal 1.1, identifying the coverage category	87
Sub-goal 1.2, understanding the strength and weakness of the coverage category	87
Sub-goal 1.3, understanding how the conversion routes will adjust to the indentified coverage	87
Step 2: Identify decisions the quarterback must make.....	88
Step 3: List the information needs (SA) of the quarterback.	91
Phase III: Results of the Situation Awareness Global Assessment (SAGAT) questions.....	96
Level ONE questions.	98
Level TWO questions.	99
Level THREE questions.	101
Results in Answer to Research Question 2.	102
Phase IV: Results of programming SAGAT probes into PlayAction Simulator PC	102
Selecting the play: The choice route.....	103
Individual play cards.....	103
Diagramming the play.....	104
Publishing the plays	105
Proof of concept.....	105
Results of simulator checks.	106
Phase V: Results of investigation of the PlayAction Simulator PC as a SAGAT simulation tool.....	116
View From the Virtual Pocket Results.....	117
Summary of Results	125
Chapter 5.....	128
Discussion	128
Introducing the Decision Making Model for Quarterbacks	129
The Role of Pattern Recognition in the Situation Assessment Process	131
Serially Generated Options	132
Optimization of the Serially Generated Options.....	134
Implications for Further Research.....	137

	Page
Analyzing the learning environment.....	137
PlayAction Simulator PC as a SAGAT simulation tool	139
Field testing the reliability of the probes	141
Future designs	142
Game On!	142
Democratization of Access to Quality Deliberate Practice through Virtual Simulation.....	145
REFERENCES	148
APPENDIX A: Text of Inquiry to Potential NCAA Coach Participants.....	159
APPENDIX B: Informed Consent Required of Participants	162
APPENDIX C: Interview Results Charts	166
APPENDIX D: Permissions for Reprints	184

PREVIEW

LIST OF TABLES

	Page
Table 1. Participant interview charts	81

PREVIEW

LIST OF FIGURES

	Page
Figure 1. Virtual football trainer	1
Figure 2. Klein's RPD model, variation 1	6
Figure 3. Klein's RPD model, variation 2	18
Figure 4. Klein's RPD model, variation 3	20
Figure 5. Interview recording chart	55
Figure 6. Goal directed task analysis chart	56
Figure 7. SAGAT methodology applied in the domain of American football	58
Figure 8. Interview categorization chart	64
Figure 9. Sample GDTA goal hierarchy	67
Figure 10. Choice play route diagram and explanation	72
Figure 11. Sample play request and explanation sent to XOS Digital	73
Figure 12. Sample XOS Digital customized diagram	74
Figure 13. Published simulator PlayTools diagram	75
Figure 14. Step 1 GDTA results chart	88
Figure 15. Step 2 GDTA results chart	89
Figure 16. Participant #4's safeties diagram	90
Figure 17. Step 3 GDTA results chart	95
Figure 18. Sample SAGAT questions expected	97
Figure 19. The choice route	103

	Page
Figure 20. Choice route vs. cover 3 cleo coverage	104
Figure 21. Sample XOS digital customized diagram	104
Figure 22. Published simulator PlayTools diagram	105
Figure 23. Pre-motion even vs. cover 3	106
Figure 24. Defense reacts to motion	107
Figure 25. Pre-snap trips right vs. cover 2	108
Figure 26. Post-snap read vs. cleo coverage	110
Figure 27. Correct receiver	111
Figure 28. Offense motions into trips formation	112
Figure 29. Pre-snap question	112
Figure 30. Pre-snap answer	113
Figure 31. Continuous action example no freeze	114
Figure 32. RPD decision no freeze	114
Figure 33. Post play question	115
Figure 34. Post play answer	116
Figure 35. Pre-motion cover 2	118
Figure 36. Pre-snap reaction to motion receiver cover 3	119
Figure 37. Post-motion invert coverage	120
Figure 38. Post-motion trips right offensive	120
Figure 39. Post-snap coverage category of 4 invert	121
Figure 40. Read progression.....	122

	Page
Figure 41. Blank screen	123
Figure 42. Screen example of stop-action results (SAGAT question)	124
Figure 43. Post-snap stop-action results (SAGAT answer)	125
Figure 44. Decision making model for quarterbacks	131

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.

PREVIEW

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

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Up Close and Personal

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Thanks for letting me know we have a Guardian Angel!

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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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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.

PREVIEW

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).