



Contents



Abstract	ix
Resumen	xiii
Resum	xvii
Acknowledgments	xxi
List of Figures	xxix
List of Tables	xxxix
I Introduction & Objectives	1
1 Introduction	3
1.1 Motivation	5
1.2 Scientific goals and research hypotheses	9
1.2.1 Design and development of a new task that combines NUI and smart devices:	9

1.3 Thesis structure	12
II Selected Papers	13
2 Auditory and Spatial Assessment	15
2.1 Introduction	17
2.2 Methodology	18
2.2.1 General Description of the Game	18
2.2.2 Hardware and Software	21
2.2.3 Study Sample	22
2.2.4 Measures Used in the Study	22
2.2.5 Assessment with Traditional Methods	23
2.2.6 Satisfaction and Interaction with the Game	23
2.2.7 Procedure of the Study	24
2.2.8 Statistical Analysis	24
2.3 Results	24
2.3.1 Outcomes Using the Game	24
2.3.2 Outcomes Using Traditional Methods	25
2.3.3 Satisfaction and Interaction Outcomes	25
2.4 Discussion and Conclusions	26
3 Using a Serious Game to Assess Spatial Memory	29
3.1 Introduction	31
3.2 Background	33
3.2.1 Gesture Interaction	33
3.2.2 Smart Devices	35
3.2.3 Assessment of Spatial Memory	36
3.3 Design and Development of the Game	37
3.3.1 Design of the Game	37
3.3.2 Hardware and Software	42
3.4 Study	43
3.4.1 Participants	43
3.4.2 Measurements	44

3.4.3	Study Design	46
3.4.4	Performance Outcomes Using the Game	46
3.4.5	Outcomes Using Traditional Methods	47
3.4.6	Correlations Between Our Game and Traditional Methods	47
3.4.7	User Experience	48
3.5	Discussion	49
3.6	Conclusion	52
4	Developing and Evaluating a Game for the Assessment of Spatial Memory	55
4.1	Introducción	57
4.2	Estado del Arte	59
4.2.1	Interfaces naturales de usuario	59
4.2.2	Dispositivos Inteligentes	60
4.2.3	Evaluación de la memoria espacial	60
4.3	Desarrollo	61
4.3.1	Diseño del juego	61
4.3.2	Descripción general del juego	62
4.3.3	Hardware y Software	64
4.4	Estudio	65
4.4.1	Muestra del Estudio	65
4.4.2	Variables utilizadas en el análisis	66
4.5	Resultados	67
4.5.1	Resultados del juego	67
4.5.2	Resultados utilizando métodos tradicionales	68
4.5.3	Correlaciones entre el juego y métodos tradicionales	70
4.5.4	Resultados de usabilidad y satisfacción	70
4.6	Discusión	71
4.7	Conclusiones	74

III Discussion & Conclusions	75
5 Discussion	77
5.1 Discussion	79
6 Conclusions	83
6.1 Conclusions	85
6.2 Future Works	88
6.3 Scientific contributions	88
6.3.1 Papers in indexed conferences	88
6.3.2 Papers submitted to indexed journals	89
6.3.3 Other conferences	89
6.4 Other diffusions	89
6.5 Other works	90
References	91
Bibliography	93