

Survey Questionnaire

Use of augmented reality (AR) in biomedical education

The purpose of this questionnaire is to investigate the effectiveness of using AR-based educational software (AR software) for the teaching and learning of biomedical sciences.

Course code: _____

Part A – Background information

Please circle the answer.

1	Did you know what AR is before this study?	Yes	No
2	Did you know that AR is used for education purpose before this study?	Yes	No
3	Do you have experience in AR-based learning?	Yes	No
4	Do you have experience in playing AR games?	Yes	No
5	Do you have experience in playing non-AR computer games?	Yes	No
6	Do you have experience in computer programming?	Yes	No
7	Do you spend more than two hours (on average) using electronic device(s) for learning purpose every day?	Yes	No

Please tick the appropriate box(es).

8	Which electronic device(s) do you use?							
	<input type="checkbox"/>	Mobile phone (Android)	<input type="checkbox"/>	Desktop computer	<input type="checkbox"/>	Tablet	<input type="checkbox"/>	Laptop (notebook computer)
	<input type="checkbox"/>	Mobile phone (iOS)	<input type="checkbox"/>	iPod (touch)	<input type="checkbox"/>	iPad	<input type="checkbox"/>	Others: _____
9	Which electronic device do you use most often?							
	<input type="checkbox"/>	Mobile phone (Android)	<input type="checkbox"/>	Desktop computer	<input type="checkbox"/>	Tablet	<input type="checkbox"/>	Laptop (notebook computer)
	<input type="checkbox"/>	Mobile phone (iOS)	<input type="checkbox"/>	iPod (touch)	<input type="checkbox"/>	iPad	<input type="checkbox"/>	Others: _____

Part B – AR software with basic functions (“Brain AR App”): *Your experience*

Please circle the number (in the rating scale) that best represents your opinion.

(i) What are the effects of this AR software on your learning?						
		Strongly disagree β α Strongly agree				
1	Enhancing your learning motivation	1	2	3	4	5
2	Enhancing your attention or concentration in the lesson	1	2	3	4	5
3	Facilitating your engagement in the course	1	2	3	4	5
4	Facilitating your understanding of knowledge	1	2	3	4	5
5	Consolidating your memory of the contents of the subject	1	2	3	4	5
6	Extending your awareness toward abstract concepts	1	2	3	4	5
7	Increasing your ability of applying what you have learned	1	2	3	4	5
8	Developing your ability in self-directed learning	1	2	3	4	5
9	Developing your ability in collaborative learning	1	2	3	4	5
10	Developing your communication skills	1	2	3	4	5
11	Improving efficiency of revision	1	2	3	4	5
12	Increasing your confidence in tests or examinations	1	2	3	4	5
13	Promoting enjoyment in your learning process	1	2	3	4	5
14	Stimulating your creativity	1	2	3	4	5
Overall, teaching with the AR software is better than without.		1	2	3	4	5

(ii) How effective is the use of this AR software in the following occasions?						
		Not effective β α Very effective				
1	Lectures	1	2	3	4	5
2	Tutorials <i>[please skip this question if AR was not used in tutorials.]</i>	1	2	3	4	5
3	Self-exploration (at home)	1	2	3	4	5
4	Self-exploration (not at home)	1	2	3	4	5
Teacher’s guidance is important for effective learning with AR software.		Agree			Disagree	

(iii) Are the following functions of this AR software important to you?						
		Not important β α Very important				
1	To obtain clear visualization of different body parts	1	2	3	4	5
2	To rotate 3D structures for viewing at preferred orientation	1	2	3	4	5
3	To change the magnification level (i.e. to zoom in or out)	1	2	3	4	5
4	To select the specific body part(s) that you wish to focus on	1	2	3	4	5
More functions should be included in this AR software.		Agree			Disagree	

Part C – AR software with extended functions: *Your expectation*

 Please circle the number (in the rating scale) that best represents your opinion.

(i) If new AR software is to be developed, which functions would you like to add?						
		Do not like β			α Like	
1	Tailored-made display layout (e.g. user-friendly menu)	1	2	3	4	5
2	Higher diversity of multimedia (e.g. videos and graphical contents)	1	2	3	4	5
3	Background music (with on/off selection)	1	2	3	4	5
4	Interesting sound effects	1	2	3	4	5
5	Detailed annotations of figures	1	2	3	4	5
6	Detailed labels of 3D structures	1	2	3	4	5
7	Control of the speed of animations	1	2	3	4	5
8	Definitions of medical terms	1	2	3	4	5
9	Pronunciations of medical terms	1	2	3	4	5
10	Supplementary notes or further readings	1	2	3	4	5
11	Instant self-assessment tools (e.g. “built-in Q & A” for revision)	1	2	3	4	5
12	Higher flexibility in manipulation of objects (e.g. more smooth rotation)	1	2	3	4	5
13	Higher flexibility to select which particular structure(s) and/or biological event(s) to show or hide	1	2	3	4	5

(ii) How important are the following factors in development of new AR software?						
		Not important β			α Very important	
1	High processing speed	1	2	3	4	5
2	Good use of colours	1	2	3	4	5
3	Clear fonts	1	2	3	4	5
4	High quality of figures	1	2	3	4	5
5	High diversity of multimedia	1	2	3	4	5
6	Appropriate amount of contents	1	2	3	4	5
7	Good integration of contents with the curriculum	1	2	3	4	5
8	Clear classification of topics with specific focuses	1	2	3	4	5
9	Careful selection and organization of materials (e.g. based on opinions provided by teachers in the process of AR software development)	1	2	3	4	5

(iii) AR software is suitable for facilitating learning of which aspect(s) of biomedical science?						
		Not suitable β			α Very suitable	
1	Anatomy (with emphasis on anatomical structures)	1	2	3	4	5
2	Physiology (with emphasis on physiological functions and processes)	1	2	3	4	5
3	Biochemistry (with emphasis on biochemical reactions)	1	2	3	4	5
4	Anatomy + Physiology	1	2	3	4	5
5	Physiology + Biochemistry	1	2	3	4	5

6	Anatomy + Physiology + Biochemistry	1	2	3	4	5
7	Microbiology	1	2	3	4	5
Overall, I anticipate that new AR software (with extended functions) will be useful in assisting my learning of biomedical science.		Agree			Disagree	

(iv) AR software is suitable to be applied on which biological system(s)?						
		Not suitable β \rightarrow Very suitable				
1	Integumentary system	1	2	3	4	5
2	Musculoskeletal system	1	2	3	4	5
3	Circulatory system	1	2	3	4	5
4	Respiratory system	1	2	3	4	5
5	Digestive system	1	2	3	4	5
6	Urinary system	1	2	3	4	5
7	Nervous system	1	2	3	4	5
8	Endocrine system	1	2	3	4	5
9	Immune system	1	2	3	4	5
10	Reproductive system	1	2	3	4	5
Overall, I anticipate that new AR software (with extended functions) will be useful in enhancing my understanding of biological systems.		Agree			Disagree	

Part D – Effective use of AR software

Please circle the answer that best represents your opinion.

1	How much time (on average) should be spent on learning with AR software every day?	< 15 min	15-30 min	30-60 min	> 60 min
2	What proportion of a lecture should be spent on AR software?	<10%	10-30%	30-50%	>50%
3	AR software is most effective by “augmenting” which physical object?	Lecture notes (e.g. printed PowerPoint slides)	3D model of human body (or body parts)	Real human body	Others: _____

Thank you!