

Evaluation of Serious Games for Passenger Education

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Passenger Education

....are they paying attention?

A 2000 NTSB Safety Study investigated 46 accidents that occurred between September 1997 and 1999 involving 2651 passengers. Of 399 responses received to a questionnaire asking whether the passenger had watched the briefing and read the safety card, 44% responded that they neither listened to the safety briefing nor examined the card.



US Airways Flight 1549

- Of the 150 passengers, 17% reported watching some of the preflight safety briefing
- 13% reported watching some of the demonstration
- 8% reported reading the safety card before or during the flight
- 70% reported not watching the safety briefing
- 90% reported not reading the safety card



American Airlines Flight 383



Southwest Flight 1380



FAA Reauthorization Act of 2018

These and similar incidents, and their related public outcry and reporting, led to the addition of several items to the FAA reauthorization act of 2018 calling for research into methods to mitigate or eliminate future occurrences of these events. Passenger information efforts were identified by the Cabin Safety Research Team (CSRT) as a possibly fruitful area of research for changing passenger behavior during accidents, in addition to parallel research efforts conducted by other teams on physical attributes and any changes that may assist in future mitigation.



Evaluation of Serious Games for Passenger Education

This study ran in conjunction with the study Effects of Airplane Seat Dimensions on Egress:

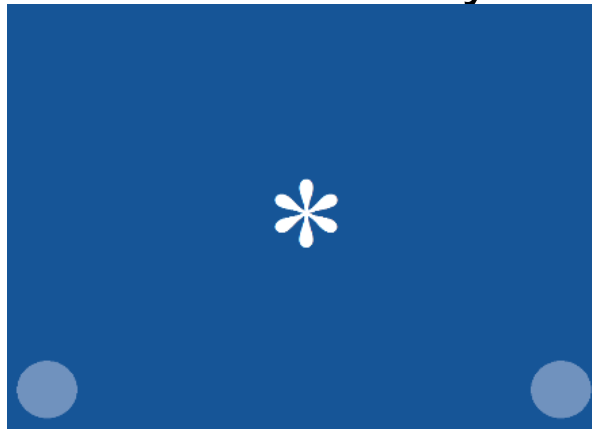
- Participants began the day going through the procedures and measurements of the initial study. The first 30 participants through measurement were selected to participate in the Serious Games study
- There were 6 groups of 30 participants
- Participants were first given a passenger education pre-test
- Participants then were given a cognitive test, the Automated Neurological Assessment Metrics (ANAM), to assess several cognitive functions including reaction time and memory search



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ANAM, Simple Reaction Time

This test measures simple reaction time by presenting the user with a series of "*" symbols on the display. The user is instructed to respond as quickly as possible by tapping in the response area (lower right on the screen) with their thumb each time the stimulus appears. This test is repeated at the end of the test battery.



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Participants then began the study. They were given a series of 3 briefing types with 3 different presentation styles.

Group #	Presentation Style		
	Brace Position	Life Vest	Oxygen Mask
Group 1	Briefing Card	Video Briefing	Serious Game
Group 2	Briefing Card	Serious Game	Video Briefing
Group 3	Video Briefing	Briefing Card	Serious Game
Group 4	Serious Game	Briefing Card	Video Briefing
Group 5	Video Briefing	Serious Game	Briefing Card
Group 6	Serious Game	Video Briefing	Briefing Card



Evaluation of Serious Games for Passenger Education

Participants were given a passenger education post-test after each briefing/presentation.

After finishing the last post-test, participants were transferred back over to the study, Effects on Airplane Seat Dimensions on Egress.

Once completing the study, Effects of Airplane Seat Dimensions on Egress, participants returned for a final passenger education post-test.



Briefing Card

BRACE POSITION

1



2

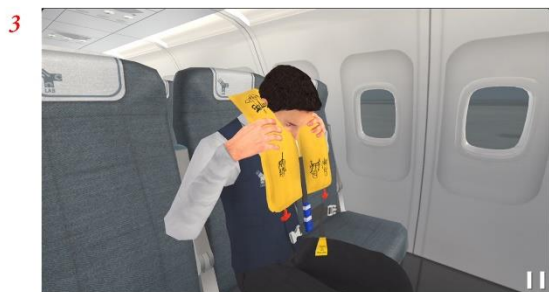


3



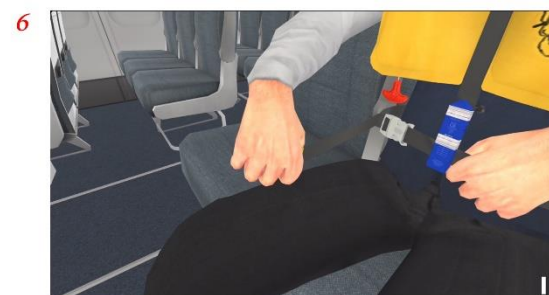
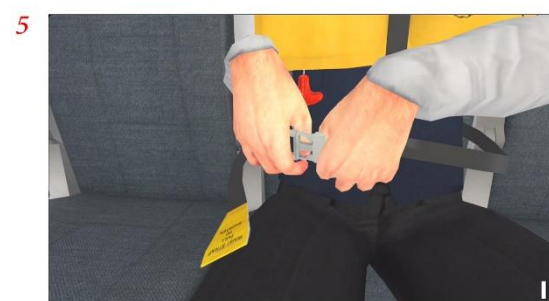
Briefing Card

LIFE VEST



TURN PAGE OVER

LIFE VEST



Briefing Card

OXYGEN MASK

1



2



3



Serious Games



Demographics

A total of 180 participants were recruited, of whom 175 completed the study with usable data. Five participants were censored due to self-elimination or other factors. Of the usable participants, 75 were female (42.9%), and 100 were male (57.1%). Ages ranged from 18 to 60 years.

Education Level	Total	Percentage
Some High School	2	1.1%
High School Graduate	22	12.6%
Some College	75	42.9%
Associate's degree	21	12%
Bachelor's degree	32	18.3%
Graduate degree	23	13.1%

Flights in the Last 12 Months	Total	Percentage
Missing data	3	1.7%
0	76	43.4%
1-3	53	30.3%
4-6	29	16.6%
7-9	8	4.6%
10+	6	3.4%

Experience Level	Total	Percentage
No experience	13	7.42%
Little experience	16	9.14%
Some experience	56	32%
Experienced	51	29.14%
Very experienced	39	22.3%



Pre-Test – Brace Position

Describe where and how to position your feet - looking for the phrases "flat on the floor" and "behind knees".

- Feet forward
- In front of you
- On the ground
- Position them apart
- Hip width apart
- Shoulder width apart
- Normal length apart

Describe where and how to position your head - looking for the phrases "against the seat in front of you" and "lowered towards your knees".

- Lean forward and place head against forearms
- Straight ahead
- Against the chair and facing forward
- Straight back against the head seat
- I'm going to push my head back and try not to get whiplash



Pre-Test – Brace Position

Describe where and how to position your hands - looking for the phrases "behind the knees" or "below the thighs".

- Hands over head
- Intertwined behind head
- On top of the chair in front of you, close together
- Over head, locked
- Clasped behind head
- Position hand on armrests on either side of you
- On hand rest gripping to keep your balance
- Crossed across chest
- Straight down
- Right angle elbows to side
- On the hand seater
- To the side of my chair, sometimes crossed



Pre-Test – Life Vest

Describe where the life vest is located - looking for the phrases "in a compartment" and "under the seat/chair".

- Under/bottom of the seat cushion
- Depends on what aircraft your on
- Pouch on the seat in front of you
- Overhead compartment
- Back of the plane by the door
- Under the seat in front of you in the chair

Describe how to open the life vest pouch - looking for the phrase "pull the tab".

- Like a bag of chips
- Rip it
- Unzip it
- Just shake it out
- Pull the levers
- It should open on its own when needed
- Should be a button, unlock it
- The vest is loose and not in a plastic pouch, unroll the vest and prepare to put it on



Pre-Test – Life Vest

Describe the procedures for donning or wearing the life vest - looking for the phrases "over your head", putting the strap "around your waist", "buckling" the life vest, and pulling the strap "tight".

- Place around neck and blow up
- Like a shirt
- Children and women first
- Place it on your chest and wrap your arms around it
- Head through vest like a neck pillow
- Push button to make it blowup, to use it put it on
- Like a standard backpack



Pre-Test – Oxygen Mask

Describe how to activate the oxygen mask - looking for the phrase "pull down".

- Mask is already activated/automatic
- Plug it in to the overhead compartment
- Push on a button/switch
- Activation is done by the pilot
- I honestly don't know even after flying countless times
- There is a button above your seat. Once it is pushed, the oxygen mask will pop out. There is a string on the front of the mask that will open the breathing compartment

Describe how to wear an oxygen mask - looking for the phrases "over nose", "over mouth", and "strap around head".

- Place over your face/on your face/hold it on your face
- Probably over your head

Describe how to secure the oxygen mask - looking for the phrases "adjust" or "pull" straps.

- Put the strap around the head
- Tie is up to secure it
- With both hands
- There is a clip in the back



Results

Pretest Scores

Information Type (number of questions)	Score (points)								Total
	0	1	2	3	4	5	6	7	
Brace Position (4)	29	80	62	4	0	NA	NA	NA	175
Life Vest (7)	37	46	51	24	14	3	0	0	175
Oxygen Mask (5)	17	27	25	53	42	11	NA	NA	175

Note. NA = not applicable.



Results

Posttest, Brace Position

Presentation Style (Brace)	Score (points)					Total	Mean
	0	1	2	3	4		
Briefing Card/Number of Participants	0	6	8	43	0	57	2.65
Video Briefing/Number of Participants	1	4	16	23	15	59	2.80
Serious Game/Number of Participants	0	2	13	16	28	59	3.19
Total	1	12	37	82	43	175	



Results

Posttest, Life Vest

Presentation Style (Life Vest)	Score (points)								Total	Mean
	0	1	2	3	4	5	6	7		
Briefing Card/Number of Participants	0	4	10	17	13	10	6	0	60	3.55
Video Briefing/Number of Participants	1	1	4	10	15	13	11	3	58	4.33
Serious Game/Number of Participants	0	0	1	8	6	19	17	6	57	5.07
Total	1	5	15	35	34	42	34	9	175	



Results

Posttest, Oxygen Mask

Presentation Style (Oxygen Mask)	Score (points)						Total	Mean
	0	1	2	3	4	5		
Briefing Card/Number of Participants	1	1	10	20	16	10	58	3.36
Video Briefing/Number of Participants	0	3	4	22	15	14	58	3.57
Serious Game/Number of Participants	0	1	0	13	23	22	59	4.10
Total	1	5	14	55	54	46	175	



Discussion

The findings suggest that virtually performing an action resulted in a higher level of retention than either viewing still images of an action or seeing/hearing an action being performed.

Individuals who had been on multiple flights within the past year did not have an advantage in retaining safety information over those participants with zero flights.

Individuals with more academic experience retained safety information better in all three assessment.

