Mission US: Up from the Dust
Summary of Results from a 2016 Quasi-Experimental Classroom Study

Mission US: Up from the Dust is the fifth installment in the *Mission US* series of digital role-playing games created for elementary and middle school US history classrooms. Created by THIRTEEN/WNET New York Public Media and its partners Electric Funstuff (EFS) and the American Social History Project (ASHP), *Up from the Dust* confronts students with the twin economic and environmental disasters that struck America in the 1930s: the Great Depression and the Dust Bowl. *Up from the Dust* is the first *Mission US* game to be developed for tablet delivery and availability in the app store; development in 2014-16 was funded by a US Department of Education Small Business Innovation Research grant.

Education Development Center, Inc. (EDC), a not-for-profit education media research firm, conducted a quasi-experimental research study to determine how feasible the game was for teachers to implement, and the impact of the game and curriculum on student learning outcomes. EDC also performed formative research throughout the game development process that guided its design at each stage.

EDC's summative research study focused on two primary questions:
1. *Feasibility.* How effectively are teachers able to integrate the online and tablet versions of the game into their normal instruction?
2. *Learning Outcomes.* Do students who use the online or tablet game perform better on an assessment of Depression-related history knowledge than students who study the topic using typical materials and methods?

In terms of feasibility — EDC's study found strong evidence that *Up from the Dust* is easy for teachers to implement in the classroom, is a strong curricular fit with required US history content and skills, is easily adapted to different populations and teacher styles, and is highly motivating for students.

In terms of learning outcomes — EDC's study found that students who studied the Great Depression and Dust Bowl using *Up from the Dust* significantly outperformed those who studied the topics using typical materials on standardized measures of US history knowledge and skill. The data on learning outcomes was extremely promising, with the *Mission US* group showing a 14.9% knowledge gain from pretest to posttest, compared to a comparison group increase of less than 1%.

Background on the Study

Sample. The study was conducted in three middle schools in the NYC metro area that have racial and economic demographics characteristic of New York City public and parochial schools. Subjects included three eighth-grade social studies teachers and a total of 146 students in six classrooms. Schools and teachers were recruited through email lists of middle school educators who had participated in US DOE-funded Teaching American History professional development projects in the prior 10 years. School A and School B were public middle schools in Queens, New York. School C was a parochial school in suburban Tuckahoe, New York.

Design. EDC employed a within-teacher comparison group design, in order to control for teacher effectiveness and better observe differences in teaching and learning with *Up from the Dust* compared to traditional curriculum and materials. In each school, the participating teacher shared achievement data for all of their eighth grade U.S. history classes with EDC. Working with teachers, researchers identified the two classes that were most closely matched in terms of student ability level, based on prior ELA scores, size, and ratio of ELLs and students with IEPs. Researchers then randomly designated one class the treatment classroom and the other the comparison classroom.

The teacher and students in School B accessed *Up from the Dust* on iPads supplied by EDC. School B was chosen because it had poor Internet connectivity and might benefit most from having the game resident on the machines. Schools A and C accessed the game via Chrome book computers and the Internet.

Teachers taught the Great Depression unit over 6-7 classroom days, using the *Up from the Dust* game and curriculum in their treatment classroom, and their usual methods and materials in the matched comparison classroom, and other classes. Researchers verified that in business-as-usual classes teachers covered the same topics that are in the game. Observations in comparison classes verified that teachers addressed these topics competently, using a range of methods and materials – lectures, reading packets, primary documents, photos, videos, writing, and class discussion.

Measures. To examine the game's classroom feasibility, EDC used classroom observations and teacher interviews and questionnaires. To examine learning outcomes, EDC administered a 14-item online pretest of student historical knowledge and skill to all students before the Great Depression unit began, and an identical posttest within a week of the unit's end. The multiple choice and short answer items all addressed knowledge of the Great Depression & Dust Bowl, and skills of reading period primary documents such as historical photos of breadlines and bank runs. All items were drawn from validated standardized tests: past Grade 8 New York State Regents exams and past NAEP U.S. history exams. Four of the 14 questions were modified to better emphasize ideas about average Americans' experience of the Depression that the study teachers said were important in their teaching and were also part of the game, including such things as bank runs, mortgage foreclosures, the Bonus Army, and riding the rails.

Learning outcomes in greater detail

As displayed in Table 1, EDC found considerable differences in pre/post student performance. Students in the treatment classrooms demonstrated average gains of nearly 15 percentage points, compared to their peers in the comparison group who gained an average of less than one percentage point. In fact, although students in the treatment group scored an average of 5.6 points *lower* than students in the comparison group (49.8% versus 55.4%) on the pre-assessment, they finished an average of 8.7 points higher on the post-assessment (64.7% versus 56.0%).

Table 1. Pre- and Post-Assessment Comparison: Treatment vs. Comparison

	% Correct Pre	% Correct Post	Change (in % points)
Treatment	49.8% (n=99)	64.7% (n=69)	14.9
Comparison	55.4% (n=66)	56.0% (n=77)	0.6

These data underscore the ability of a well-designed digital game like Up from the Dust to improve middle school students' understanding of core U.S. history ideas and content, when implemented as intended over 4 or 5 classroom sessions.

When we look at the item-level data (Table 2 below) we see that treatment students outperformed comparison students on nearly all of the questions (12 out of 14). The questions for which the difference is greatest (Questions 3, 9 and 13) suggest that the game is helping students gain both a basic conceptual grasp of historical events as well as an understanding of different social groups' experiences of those events — a key goal of the game. Question 3, where treatment students outperformed comparison students most (a difference of 41%), asks "Which best describes President Franklin D. Roosevelt's response to the Great Depression?" The answer —"He believed the government should provide relief to people out of work"— is a fundamental "big idea" in the study of the Depression and New Deal. Questions 9 and 13, which ask students to identify what "riding the rails" means and what "farm foreclosures" are, respectively, reflect their knowledge of the Depression-era experiences of, on the one

hand, hundreds of thousands of young and out of work men at this time, and rural Americans, on the other.

Table 3. Post-Assessment Item Analysis: Treatment vs. Comparison (N=146)

% Correct				
	All (N=146)	Treatment (n=69)	Comparison (n=77)	Difference
Q2	63.7	69.6	58.4	11.1
Q3	50.7	72.5	31.2	41.3
Q4_1	37.3	39.1	35.7	3.4
Q4_3	25.0	21.7	27.9	-6.2
Q5	68.5	71.0	66.2	4.8
Q6	41.8	44.9	39.0	6.0
Q8	73.3	75.4	71.4	3.9
Q9	50.7	69.6	33.8	35.8
Q10	68.5	71.0	66.2	4.8
Q12	74.0	71.0	76.6	-5.6
Q13	44.5	53.6	36.4	17.3
Q16	82.9	85.5	80.5	5.0
Q17	65.1	66.7	63.6	3.0

Conclusions

These data support the conclusion that, implemented as intended, *Up from the Dust* can help middle-school-age students learn important U.S. history concepts and information, and can do so more effectively than standard teaching materials and methods.

Study results thus offer strong evidence of *Up from the Dust's* feasibility and appeal as a classroom product, and also its promise in improving student learning outcomes in U.S. history.

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