



ARTé: MECENAS™ 2016C1 GAMESTUDY RESEARCH REPORT

Short Summary of Study

In Fall 2016, Triseum™ conducted a study on the game ARTé: Mecenás with purposeful sampling of art history students. The preliminary finding indicates that with approximately 2 hours of game play, participants in the experimental group had a **knowledge gain of 24.7% (n = 66, p < .0001)** from pre-test to post-test. The finding is considered preliminary based on item scaling procedures in Item Response Theory (IRT). Results indicate “good” model fit (RMSEA = .03), but the Test Information Curve peaked at 4 (>5 is considered sufficient). The nearly 25% gain is practically significant (Cohen’s $d = 1.14$, large effect) in an educational setting for a single unit of complementary instruction.



- Participants played ARTé: Mecenás online for about 2 hours within 1 week, on average.
- Local and external independent studies are planned to replicate this research.

Summary of Study

In Fall 2016, Triseum conducted a study to measure the learning efficacy of ARTé: Mecenás. Based on the Test Information Curve results (see below), these findings are preliminary and may change with additional studies.

Purposeful sampling was used. Participants were recruited from a pool of students in a college level art history survey course (the target audience for the game). In total, 184 participants consented to join the study, and 173 participants completed the study and earned extra credit in their course for participating.

Participants were assigned to one of two groups:

1. The test validation group (n = 107) played ARTé: Mecenás and took both external test forms as post-tests.
2. The experimental group (n = 66) took pre-tests, played ARTé: Mecenás and took post-tests.

Participants in both groups were asked to play ARTé: Mecenás (v 1.0) online for at least 2 hours within 1 week. On average, participants played for 2 hours and 10 minutes. It takes 3-4 hours to finish the entire game. Of those participants, 83.2% achieved success in Level 1, 35.8% achieved success in Level 2, 22% achieved success in Level 3, and 5% achieved success in Level 4.



The participants took art history pre- and post-tests. Two test forms were created based on the game's student learning objectives. Each form had 16 items: 10 multiple-choice questions and 6 open-response items. Participants in the validation group (n = 107) completed all 32 items. To validate the assessments, test-scaling procedures from Item Response Theory (IRT) were applied to the test validation group's data on both forms of the test. Scaling procedures in IRT produced the following results:

- 10 items did not discriminate ability and were omitted from further analysis.
- 22 items were retained for further analysis.
- The model fit index for these items (RMSEA = .03) indicates "good" model fit (RMSEA <.05).
- The Test Information Curve peaked at 4 (>5 is sufficient, >10 is desired to achieve a 95% confidence interval for reliability).

Item parameter estimates from the test validation results were applied to item scores of the experimental group to calculate the individuals' performance on an IRT theta

scale, representing ability (ranging from -3 to 3). A paired t-test (n = 66) was conducted to compare average pre-test to average post-test theta scores. For the experimental group, there was a statistically significant difference (t = 8.03, df = 65, p < 0001) from pre test (mean = -0.5783, SD 0.6400) to post-test (mean = 0.0859, SD 0.5104). On average, participants gained 0.6642 theta (SD .6718), an effect size of 24.7% (r = .4976), with a Cohen's d effect size of 1.14 (large effect).

Future Research

To strengthen these findings, Triseum plans to fortify the Test Information Curve with data from an additional Fall 2016 test validation study (n = 126) and additional Spring 2017 efficacy studies. The additional test validation group and experimental group data will be pooled with extant data for a more comprehensive analysis. Triseum is also seeking independent researchers to replicate the study. If interested in conducting research on ARTé: Mecenas, please contact learning@triseum.com.

