

XPRIZE DIGITAL LEARNING CHALLENGE

Sponsored by the Institute of Education Sciences (IES)

RULES & REGULATIONS 1.1

October 2021

XPRIZE Digital Learning Challenge | IES is governed by these **Rules & Regulations**. **These Rules supersede the Challenge Guidelines** originally published March 22, 2021. All participating Teams must adhere to these Rules for the rounds in which they compete in order to progress through the Challenge milestones and be qualified for selection as a winner of the Challenge. Failure to adhere to these Rules may result in consequences as detailed in the Competitor Agreement.

XPRIZE may revise these Rules and Regulations at any time during the course of the challenge to provide additional information or to improve the quality of the Challenge. Future versions, amendments, technical notes, or other documents may continue to elaborate on the operation of the challenge, including exact dates and locations of events, specific technical thresholds for performance testing, and operational information.

Unanticipated issues, including restrictions to travel, may also necessitate modifications to these documents. XPRIZE reserves the right to revise these Rules and Regulations as it, in its sole discretion, deems necessary or desirable. All registered Teams will be notified of any revisions in a timely manner.

Please send any questions about this challenge to DigitalLearning@xprize.org.

NOTE: **Bolded** items are defined in Section 08: Glossary.

The changes from version 1.0 of the Rules & Regulations include the updated timeline, clarifications in Challenge requirements, and revision to the Pilot phase judging criteria. **This version supersedes other versions.**

1 OVERVIEW

The purpose of this release of the Rules and Regulations (“Rules”) is to provide the details and technical specifications required for Teams to provide submissions for the different phases of the Digital Learning Challenge.

2 ELIGIBILITY

The Digital Learning Challenge is open to any United States-based individual, educational institution, non-profit, NGO, company, corporation, person, or any other non-governmental legal entity, regardless of size or locality.

XPRIZE and the Challenge sponsor believe that solutions to humanity’s greatest challenges can come from anyone. Engineers, academics, entrepreneurs, developers, data scientists, and other innovators with new ideas from all over the world are invited to form a Team and register to compete. To succeed, Teams may need to recruit additional experts and can add new members at any time throughout the Challenge.

3 COMPETITION TIMELINE

The XPRIZE Digital Learning Challenge is a 24-month competition, launching March 22, 2021 and concluding March 2023 (exact dates subject to change).

March 22, 2021	Challenge Launch: Team Registration Opens & Guidelines Released
April 22, 2021	Updated Guidelines Published
April 22, 2021	Team Questionnaire Released to Teams
May 24, 2021	Team Questionnaire Opens in POP
June 2021	Updated Guidelines Released
July 2021	Rules & Regulations Version 1.0 Released
October 15, 2021	Team Technical Submission Opens
October 31, 2021	Team Registration Deadline (Questionnaire and Competitor Agreement)
December 1, 2021	Team Technical Submission Deadline
December 15, 2021	Insurance & Eligibility Verification Deadline
January 2022	Technical Submission Judging
January 2022	Teams Notified of Approval to Proceed to Pilot Study
January 2022	Pilot Study Submission Opens
July 2022	Pilot Study Submission Deadline

July - August 2022	Pilot Study Submission Judging
August 2022	Finalist Teams Notified (up to 5 Finalist Teams split \$250,000)
August 2022	Demonstration Phase Opens
February 2023	Demonstration Phase Deadline
February - March 2023	Demonstration Phase Judging
March 2023	Grand Prize Winners Announced

Note: All dates subject to change

4 CHALLENGE REQUIREMENTS

To be eligible to compete, continue to subsequent rounds of the Challenge, and to be considered for any prize award Teams must complete all minimum requirements laid out by XPRIZE and/or the Judging Panel.

All Teams must fully register to compete at pop.xprize.org (also known as the Prize Operations Platform “POP”) by 11:59PM PST . There is no registration fee, but Teams must be legal entities permitted to do business with the U.S. Department of Education. To fully register teams must complete the Questionnaire Submission and sign the Competitor Agreement (both located on POP)by the deadline of October 31, 2021. XPRIZE will review this documentation and verify completeness. Teams will only be approved to proceed to the next phase, the Technical Submission phase, after being confirmed by XPRIZE.

TECHNICAL SUBMISSION PHASE REQUIREMENTS

Upon receiving approval from XPRIZE to proceed in the Challenge, Competitors will have until 11:59PM PST on December 1, 2021 to submit the Team Technical Submission online at pop.xprize.org for the Judging Panel to review. Teams will submit their systems, as well as any technical documentation on the system (such as diagrams, drawings, schematics, videos) and other written explanations of the functionality and architecture of the system, with particular evidence of the system’s ability to deliver high quality experiments and replications.

Teams will also be required to demonstrate their ability to set up pilot studies ahead of those to be carried out during the Pilot Study and Demonstration Phase of the challenge. Teams will have the option to include any data from pilots or experiments they have already performed to demonstrate their system’s function as designed.

At a minimum, the platform will need to collect the data needed to analyze the experiment: (1) indicator of treatment or control, (2) measures of the outcome variable of interest, and (3) any other independent variables that might be useful to increase precision of impact estimate or describe implementation.

All submissions will be screened by XPRIZE for completeness. The Judging Panel will then review the Technical Submissions and select up to 50 Teams to advance to the Pilot Study phase of the challenge.

PILOT STUDY PHASE REQUIREMENTS

Teams that have advanced to the Pilot Study phase will have approximately six months to conduct **Pilot Studies** in accredited education institutions settings to demonstrate the capabilities of their systems. Teams will submit a Pilot Study Submission online at pop.xprize.org for the Judging Panel to review by July 2022 (specific dates TBD). Teams will be required to submit both a technical report of their pilot, the raw data generated by the study, reports of the data, and a set of analyses using the raw data. During the pilot phase, Teams will need to carry out a (minimum) one-month-long pilot experiment in an education setting in the United States and demonstrate the ability and capacity to conduct rigorous research—and to form partnerships with educational institutions with diverse populations in order to conduct experiments. Teams must conduct at least one experiment and at least one replication with at least one learner demographic by the Pilot Study Deadline. XPRIZE will make a best effort to help facilitate team partnerships with educational institutions for qualified Teams that do not have existing partners in place.

During the Pilot Study, Teams must demonstrate that they have a clear path for further deployment of their tools for the improvement of the learning systems. Such plans should include, but are not limited to: a business plan showing how the winner will use its tool or method to generate revenue; an open sourcing strategy for the codes, algorithms, and models of the winning solution to be adopted; and deployment plans through partnerships or joint ventures with research institutions.

Before being reviewed by the Judging Panel, these submissions will be screened again for completeness by XPRIZE. Based on criteria defined in Section 5 Judging Criteria, submissions will then be reviewed by the Judging Panel and up to five (5) Finalist Teams will be selected to advance to the Demonstration Phase of the challenge and split a Milestone Prize of \$250,000 (up to \$50,000 awarded to each team).

To be eligible, Pilot Study Phase studies must meet the following requirements:

- Study must be conducted in a formal education setting. Formal education settings include public, private, or charter nonprofit or for-profit pre-kindergarten, primary schools, secondary schools, colleges, universities, vocational schools, adult education programs, and career and technical education programs. These education settings should reflect, to the extent possible, the diversity of students and characteristics of the American education system.
- The intervention used in the study will not be evaluated in terms of actual learner outcomes. Rather, the study must demonstrate the ability of the platform to collect and analyze data that would indicate what learning outcomes were achieved and what factors led to the intervention's effectiveness.

- The study sample size and allocation to condition should be such that the minimum true impact detectable size with 80 percent power and a 95 percent confidence interval is no larger than the minimum relevant size impact for policy or practice.
- The study design should be driven by a hypothesis that is based in established educational theory or practice that will be advanced through the findings of the study.
- Studies should be pre-registered using an open science platform (e.g. [Open Science Foundation](#))
- The study must collect at least the following data points, but is not limited to collecting just them. Teams may collect any other data they deem relevant:
 - Individual student identification (can be assigned and MUST be anonymized) with means to identify each student
 - Individual student demographic data and information on student characteristics that impact education outcomes
 - Student baseline measures
 - Student outcomes measures
 - The baseline and outcome measures must be measured using the same units
 - Student attrition
 - Process (e.g. clickstream) data describing how students interact with educational materials and activities
- Primary outcome measures should include student outcomes sensitive to the performance change the intervention is intended to bring about. Consistent with SEER principles, widely used “common measures” must be included in addition to any researcher developed measures used. Outcome measures should be pre-specified, have been demonstrated as reliable and valid for the intended purposes, and based on data-collection methods that have been shown to yield reliable data.
- Study must last no less than 4 weeks from the date of baseline data collection and outcome data collection. The study must be conducted within the timeframe of the Pilot Study Phase, which begins January 2022 and ends July 2022 (specific dates TBD).
- Study must have received IRB approval (if required).

DEMONSTRATION PHASE REQUIREMENTS

Finalist Teams will have an additional six months to conduct experiments that demonstrate the full capabilities of their systems and running and replicating experiments. Teams will submit the Team Demonstration Phase Submission online at pop.xprize.org for the Judging Panel to review by February 2023 (specific dates TBD). Teams will be required to submit both a technical report of their experiments, the raw data generated by the study (with appropriate safeguards protecting privacy and in compliance with the team’s IRB requirements), reports of the data, and a set of analyses using the raw data.

To be eligible for the final **Prize Purse**, Teams must demonstrate the ability to conduct an experiment and at least five systematic replications of that experiment with at least three learner demographics in no more than 30 days.

Submissions will be reviewed by the Judging Panel to select a Grand Prize Winner and a Runner-Up Team for the challenge who will, respectively, be awarded a \$500,000 grand prize and a \$250,000 runner-up prize. The winning **Solutions** will be those that meet the minimum requirements and are best able to demonstrate the robustness of their system to host a variety of experiments of education interventions. This might include randomly assigning students, teachers/classrooms/schools to groups, collecting relevant high quality data, and conducting reproducible analyses based on those data that demonstrate the capabilities of the system. Ideally, the winning team will be able to provide comprehensive measures, multi-dimensional representation of learner engagement, robustness of measures in relation to the constructs that are attempted to be measured, and will include contextual and granular data as well.

Teams will NOT be assessed on whether the interventions used in their experiments produce the desired impact, but rather will be evaluated by the ability of their systems to conduct experiments and *measure* learning processes and outcomes as further outlined in Section 5 below.

5 JUDGING CRITERIA AND SELECTION OF FINALISTS AND WINNERS

In the Technical Submission Phase, all Teams that submit a complete Technical Submission (as described in Section 4) will be reviewed by the Judging Panel based on the Technical Submission Judging Criteria described below. The Judging Panel will then select up to 50 Teams to advance to the Pilot Study phase of the challenge.

In the Pilot Study Submission Phase, all Teams that submit a completed Pilot Study Submission (as described in Section 4) will be reviewed by the Judging Panel based on the Pilot Study Submission Judging Criteria described below. Judges will select up to five (5) Finalist Teams who will advance to the Demonstration Phase. These Finalist Teams will share equally in a \$250,000 milestone award.

In the final Demonstration Phase, all Teams that submit a completed Demonstration Phase Submission (as described in Section 4) will be reviewed by the Judging Panel based on the Demonstration Phase Judging Criteria described below. One (1) winning team will be awarded \$500,000 and one (1) runner up team will be awarded \$250,000.

The Judging Panel shall have sole and absolute discretion to declare the winners of the Challenge. Decisions of the Judging Panel are binding on XPRIZE, sponsors, and each Team Member. Per the Competitor Agreement for this Challenge, all parties will agree not to dispute any decision or ruling

of the Judging Panel. Teams shall have no right to be informed of other Teams' calculations, measurements, and results, unless such information is made publicly available by XPRIZE.

If no Team meets the criteria for an award, then the Judging Panel will retain sole and absolute discretion to declare or not declare a winner of the Challenge and/or otherwise coordinate with XPRIZE to allocate or choose not to allocate one or more of the Awards and/or any other Award associated with the Challenge.

TECHNICAL SUBMISSION PHASE JUDGING CRITERIA

During each phase of the Challenge, Team submissions will be measured against set criteria aligned with the Challenge goals. Some judging criteria are binary. For example, Teams must demonstrate adherence to open data requirements, data standards, and institutional review board requirements as described below in Section 6. Other criteria will be ranked based on the scoring rubric developed by XPRIZE and the Judging Panel.

For the Technical Submission Phase, the Judging Panel will evaluate each team's submission for the likelihood of success during the pilot study phase. Specifically, the Judging Panel will assign a confidence score for each of the pilot study criteria listed in the next section and advance the aggregate highest scoring Teams to the Pilot Study Phase. The Judging Panel will select up to 50 Teams to proceed to the Pilot Study phase of the Challenge based on scores received on the Technical Submissions. Please note that Judging Panel evaluations are confidential and the actual scores will not be shared with teams.

PILOT STUDY PHASE JUDGING CRITERIA

All Teams will again be judged against both binary and ranked scoring criteria. For example, Teams must demonstrate adherence to open data requirements, data standards, and institutional review board requirements as described below in Section 6. Other criteria will be ranked based on the scoring rubric developed by XPRIZE and the Judging Panel.

The Judging Panel has proposed the following scoring criteria:

1. The **functionality and capability** of the technology/platform used in the pilot study (e.g. ease of use, issue mitigation, etc.);
2. The **substantiveness** of the interventions and the outcomes that are being measured;
3. The **quantity and variability** of replications and the **speed** with which they are able to be carried out;
4. The **sufficiency** of the sample size of the experiment and replications in relation to Teams' power analyses;
5. The **variability** of the populations with which experiments and replications are run;
6. The **soundness** of the experimental design;
7. The **quality** of data gathered, including data on learning contexts, contextualized learner demographics, attendance data; and

8. The **scalability** of the experimental design.

Teams will not be judged on what they find, but rather on the quality of evidence that they produce. XPRIZE and the Judging Panel reserve the right to modify the scoring criteria as necessary before the Pilot Study Phase submission date. Any such changes will be promptly communicated to Teams in future releases of the Rules & Regulations ahead of the Pilot Study Phase.

DEMONSTRATION PHASE JUDGING CRITERIA

All Teams will again be judged against both binary and ranked scoring criteria. For example, Teams must demonstrate adherence to open data requirements, data standards, and institutional review board requirements as described below in Section 6. Other criteria will be ranked based on the scoring rubric developed by XPRIZE and the Judging Panel. Please note that Judging Panel evaluations are confidential and the actual scores will not be shared with teams.

The Demonstration Phase Criteria will be similar to the Pilot Study Phase criteria mentioned in the previous section, and will be shared with Teams in future releases of the Rules & Regulations ahead of the Demonstration Phase.

6 COMPLIANCE WITH LAWS AND REGULATIONS

All Teams and all Team members must adhere to all laws (including but not limited to) local, regional, national, and international laws, orders, directives, ordinances, treaties, rules, and regulations for all aspects of the Challenge. Teams are solely responsible for acquiring any appropriate licenses, waivers, or permits from the applicable regulatory bodies or other applicable third parties.

DATA STANDARDS AND OPEN DATA REQUIREMENTS

Competing Teams must demonstrate compliance with Federal and Department of Education open data requirements, which can be found at https://ies.ed.gov/funding/datasharing_implementation.asp. Teams must also demonstrate adherence to all necessary and relevant data privacy and confidentiality requirements including federal, state and local law in the locality where the pilots are done.

Competing Teams must use CEDS data standards and governance, as outlined in <https://ceds.ed.gov/dataModelEntities.aspx>. XPRIZE will create a centralized repository of data following CEDS standard models. The system will validate the accuracy of the data in the centralized repository. Teams will connect their solutions to this repository so that XPRIZE can collect and validate the data.

INSTITUTIONAL REVIEW BOARD (IRB) REQUIREMENTS

The XPRIZE Foundation is a non-profit within the United States and all Teams awarded funds by the XPRIZE Foundation and The Institute of Education Sciences (IES) must adhere to the ethics processes typical of research universities within the United States. Teams performing any experimentation and/or who collect data about people (e.g., having people interact with a chatbot) will likely require IRB review.

Competing Teams must obtain their own Institutional Review Board (IRB) approvals based on the Human Subject Regulations Decision Charts (HHS Tree), if necessary, for conducting human subjects research and submit them to the Judges. Teams will be required to provide details regarding any current and/or planned IRB review status. Teams who declare that they are IRB exempt must provide documentation to that effect for Judges' review. Systems must also comply with all other relevant regulations, such as COPPA.

- Teams will need to select one of the following options: The proposed research program is (1) Self-determined exempted from IRB review, (2) Formally exempted from ethical review by an IRB, (3) Pending ethical review, (4) Granted approval by an IRB, (5) Rejected by an IRB, (6) Pending establishment of international process equivalency, or (7) Currently exploring our legal and ethical responsibilities. Exempt Teams will still need to adhere to all relevant safeguards of privacy, confidentiality, and data protection.
- Option 1 requires submitting a written justification of your exemption qualification to XPRIZE Digital Learning Challenge staff (submitted via POP during a later phase of the Challenge) citing a specific exemption, such as detailing your [traversal of the HHS Tree](#). Options 2 through 4 above may be supported with IRB communications.
- XPRIZE and the Judging Panel will summarily reject any team inappropriately conducting research of and or providing ethically dubious results.

Please note: XPRIZE is not responsible for determining whether a team requires IRB review and it is the sole responsibility of each team to determine their status and requirements for obtaining IRB review. XPRIZE may provide additional educational materials on IRB requirements through workshops and trainings, but Teams should rely on IRB experts to ensure their compliance with all necessary regulations.

7 GLOSSARY

Below are glossary terms and additional definitions for the purposes of this Challenge:

Advisory Board: A select group of prominent advisors who contribute their wisdom, knowledge and guidance to various aspects of the prize.

Challenge Guidelines: Document for the public and for teams that describes the requirements and parameters of the challenge.

Competitor Agreement: A legal and binding document that details the responsibilities of competitors for the prize.

Digital Learning Systems: Digital learning systems (DLSs) are defined as any software that either organizes learning in both formal and informal settings or delivers content and pedagogical tools. DLSs can range from, but are not limited to, Learning Management Systems, online learning tools, curriculum products, school communication tools, data systems, educational operations software, and digital educational content, among others.

Experiments: An experiment is defined as either a randomized controlled trial or a quasi-experimental design that introduces an innovation or a new idea to a subset of a learner population with an intended goal in mind. Experiments must be instrumented to test substantive interventions and collect meaningful learner outcomes, not trivial ones. For example, being able to test the impact of the color of a button on the speed with which learners respond to an answer is a trivial intervention. Conversely, testing an increase in the number of repetitions of a mathematical concept to a subset of learners is substantive.

Experiment Infrastructure: Experiment Infrastructure is defined as an integrated set of features that enables product innovators and education researchers to implement interventions or innovations on a defined population subset and evaluate the outcomes using randomized controlled trials (RCT's) or quasi-experimental designs (QED's). Learner outcomes should include both behavior and learning gains. The best systems will enable a flexible and robust range of experiments, collect rich and insightful learning data, and require the least amount of effort from the researcher.

Judging Panel: The subject matter and technical experts who serve as an impartial and independent evaluation panel for all aspects of this prize. Judges score the team submissions and make the all award determinations throughout the challenge.

Pilot Study: Teams will have approximately six months to conduct Pilot Studies in formal education settings to demonstrate the capabilities of their systems and the Judging Panel will select up to five (5) Finalist Teams to advance to the Demonstration Phase of the challenge and split a Milestone Prize of \$250,000 (up to \$50,000 awarded to each team) based on evaluations of each team's Pilot Study submission.

Prize Operations Platform (POP): The standard XPRIZE portal for teams to input data, documents, and other information for use in the Digital Learning Challenge.

Prize Purse: Money offered, won, or received as a prize from competing in this challenge.

Rules & Regulations: Document detailing the testing protocols, specific rules, dates/times, and other details that will govern the challenge and will be binding on teams.

Solution: A team's specific submission (including all technical documentation and physical prototypes) that the Judging Panel will evaluate for this challenge.

Systematic Replications: Systematic Replications are defined as those that implement and evaluate the interventions in an original experiment in ways that systematically vary at least one aspect of the prior study, such as the geographical location; the population of learners, educators, and/or schools; and/or the intervention implementation. As Teams may use third-party learning content, we consider revisions to the intervention to include revisions to the systems' ability to conduct a study, not only revisions to the learning content. Considering the time limitations during later phases of the Challenge, competing Teams should also consider developing systems that can run multiple experiments simultaneously with different subgroups. More information about Systematic Replications can be found at https://ies.ed.gov/funding/pdf/2021_84305R.pdf.

TEAM DEFINITIONS

- **Pre-Registered Team:** A team or individual that is interested in participating in the competition and has created a profile in the XPRIZE POP system.
- **Registered Team:** A team that has provided a complete Team Questionnaire submission and has signed the Competitor Agreement will be deemed eligible to submit a Technical Submission for the Judging Panel's review.
- **Finalist Team:** Up to 5 Finalist Teams will be selected by the Judging Panel to proceed to the Demonstration Phase of the challenge based on the strength of their Technical Submission and Pilot Study Submission. Finalist Teams will split a prize purse of \$250,000 (up to \$50,000 per Team).
- **Runner Up Prize Winner:** The second place Team selected by the Judging Panel to receive the \$250,000 Runner Up Prize based on the strength of their submissions throughout the challenge.
- **Grand Prize Winner:** The team that has successfully demonstrated their solution's ability to meet and/or exceed the goals of this challenge and selected by the Judging Panel to receive the \$500,000 Grand Prize for this challenge.

Team Questionnaire: The Team Questionnaire is the initial submission where Teams will provide details about the current capabilities of their system and will be screened by XPRIZE and/or the Judging Panel for both the completeness of the proposals and for meeting minimum requirements outlined in the Rules & Regulations for this challenge.

Technical Submission: Teams will submit a free-to-use version of their systems as well as any technical documentation on the system (such as diagrams, drawings, schematics) and other written explanations of the functionality and architecture of the system in the form of the Technical Submission for this Challenge. All submissions will be screened by XPRIZE for completeness and the Judging Panel will then review the Technical Submissions and select Teams to advance to the Pilot Study phase of the challenge.

Randomized Controlled Trials (RCTs) and Quasi-Experimental Designs (QEDs): While Randomized Controlled Trials (RCTs) rely on random assignment to form intervention and comparison groups, Quasi-Experimental Designs (QEDs) form these groups using methods other than random assignment. Instead of randomly assigning subjects to intervention and control groups, they are split by some other means, with two groups formed through various, non-random processes such as using non-equivalent groups organized through non-random selection, relying on statistical methods to create a comparison group through matching, or relying on before and after time-series. More information on evaluation criteria for RCTs and QEDs can be found in the [What Works Clearinghouse Standards Handbook](#). Consistent with IES' goal to understand the generalizability of interventions, teams will be required to demonstrate their ability to deploy replications across at least three subgroups.

What Works Clearinghouse Standards and Standards for Excellence in Education Research (SEER): Competitors should use rigorous research designs that will meet What Works Clearinghouse standards with or without reservations, as well as IES-wide Standards for Excellence in Education Research (SEER).

The WWC standards can be accessed at <https://ies.ed.gov/ncee/wwc/Docs/referenceresources/WWC-Standards-Handbook-v4-1-508.pdf>.

IES has also laid out principles for conducting rigorous education research that is transparent, actionable, and focused on consequential outcomes, and which has the potential to dramatically improve student achievement. IES's SEER Principles encourage researchers to:

1. Pre-register studies
2. Make findings, methods, and data open
3. Identify interventions' core components
4. Document treatment implementation and contrast
5. Analyze interventions' costs
6. Focus on meaningful outcomes
7. Facilitate generalization of study findings
8. Support scaling of promising results

Competing Teams are highly encouraged to demonstrate their adherence to these principles. You can learn more about IES's SEER Principles at <https://ies.ed.gov/seer/> where you can explore in greater detail information about each of these principles.