Summary of Evaluation Findings

Digital Programing in Informal Science Learning Settings: Current Trends and Practices

Prepared for

Wildlife Conservation Society (WCS)

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This report is intended primarily for internal use, to be used as a scaffolding for meaning making discussions and as a record of the work completed on this project. Outline format was chosen to make the presentation more concise.

[1] *Suggested citation: PEER Associates, Hardee, C., & Duffin, M. (2015). Summary of evaluation findings: Digital programming in informal science settings, current trends and practices. Downloaded from PEERassociates.net.*

Project Background

WCS launched its electronic field trip program, Distance Learning Expeditions, in 2001 when there was tremendous interest in the educational community in the potential of videoconferencing technology for program delivery, as well as money available for the purchase of related broadcast equipment. The program grew rapidly and was successful through 2009 -- serving 9,600 students in 2006-07, its largest year. From 2010 to 2014, with school budget cuts, high equipment maintenance costs, and shifts in staffing, participation in the program declined. In 2010, WCS secured a grant from IMLS for the purpose of rethinking its Distance Learning (DL) program. No-cost extensions allowed for further assessment of changes in the DL landscape in light of new technology, more varied Digital Programing (DP) and, as the proposal stated, "to create new programing that is necessary to stay current, maintain existing audiences, and build new ones." PEER Associates, an external evaluation company, was hired to assist with the associated research and evaluation of existing and potential Distance Learning (DL) and Digital Programing (DP) opportunities and practices.

Why did we do this evaluation?

1. To reflect on WCS digital distance-learning (DL) programs and efforts to date.
2. To systematically explore future directions for WCS DL and DP.

What were we trying to learn?

1. *Past History:* What has WCS learned from 13 years of distance learning programing?
2. *Best Practices:* How are other informal science education organizations using distance learning?
3. *Industry Trends:* What are current trends in distance learning across non-profit education settings?
4. *Business Model:* What models exist for revenue generation in an open-source internet environment?
5. *Outputs/Outcomes:* How many students/schools and other audiences are WCS interested in serving? What are the hoped for knowledge, attitude, and behavior changes in target audiences?
6. *Implementation:* How does WCS create a DL program structure that can flexibly evolve? How can this DL effort tie into digital initiatives elsewhere in WCS? How does this DL effort add value, rather than just workload, to WCS staff?

What data did we collect?

1. *Research Overview* - Evaluators focused their research primarily on interviews with staff and leaders involved in the DL field. They decided that these interviews (N=14) would provide the most direct and meaningful insight into the current state of DL programing in informal science education settings. They decided not to search the academic literature since peer-reviewed research studies can significantly lag behind practice in a field that is rapidly

changing. Several relevant non-academic research reports/white papers were identified using web research and references provided by interviewees.

2. *Phone Interviews with Zoos, Aquaria, & Science Centers* - Interviews (30-45 minutes in length) were conducted with administrative or program staff (N=9) at informal science education organizations. Interviews focused on zoos (N= 6), aquaria (N=2), and an informal science education organization (N=1) because they possess contexts, challenges, and opportunities similar to those at WCS. Potential organizations/interviewees were identified using: 1) a list of DL program providers supplied by the Association of Zoos and Aquariums; 2) web research; and 3) referrals from interviewees.

   List of zoos, aquaria, and science centers interviewed:
   1. Alaska SeaLife Center (AK)
   2. Columbus Zoo and Aquarium (OH)
   3. Center of Science and Industry (OH)
   4. Indianapolis Zoo (IN)
   5. Memphis Zoo (TN)
   6. Omaha's Henry Doorly Zoo & Aquarium (NE)
   7. Phoenix Zoo (AZ)
   8. Shedd Aquarium (IL)
   9. St Louis Zoo (MO)

3. *Phone Interviews with Educational Technology Organizations* - Interviews (30-45 minutes in length) were conducted with leaders/thinkers (N=5) at non-profits with a distance learning and/or educational technology focus or mission. Interviewees were identified through referrals and web research.

   List of educational technology organizations interviewed:
   1. ASTC/CAISE (Association of Science-Technology Centers/Center for the Advancement of Informal Science Education)
   2. AZA (Association of Zoos and Aquariums)
   3. CILC (Center for Interactive Learning and Collaboration)
   4. NMC (New Media Consortium)
   5. NYIT EEZ (New York Institute of Technology/Educational Enterprise Zone)

Note: See Interview Guide (Appendix E) - The topic areas and questions in this guide were used to focus and systematize the interview conversations.

What did we learn?

The following themes, insights, and examples about Distance Learning (DL) and Digital Programing (DP) emerged from the interviews as well as from extensive systematized conversations and meetings with the client during the project.

1. *Defining and Clarifying Terminology*
    a. *Definitions* - Traditional Distance Learning (DL), as practiced at WCS and sometimes referred to as "electronic field trips," is one option in a broad, varied Digital Programing (DP) landscape. In this report, we are defining Distance Learning (DL) as a narrow subset of a much broader array of Digital Programing (DP) options.

2. *Thought Leader Observations on DL/DP at Zoos, Aquaria, and Museums*
    a. *DL Trends* - An anecdotal reference from an interview with a leading DL content provider: "At the recent CILC/ISTE conference, it was reported that traditional DL is trending down."
    b. *Internal Capacity* - From the NMC Horizon Report: 2013 Museum Edition focused on the use of DP/DL in education settings: "While it is practically impossible not to recognize the value of digital learning in today's connected world, the reality for museums is that the vast majority of institutions do not have the necessary technical infrastructure to successfully pursue goals for digital learning, and often have little time to dedicate to articulating, much less realizing, their vision."
    c. *Tipping Point* - From the interview with CILC's Executive Director describing the potential of distance learning: "There are a lot of variables. We are at the tipping point or defining moment for collaborative learning."
    d. *Revenue Generation* - From NYIT EEZ Director who states that his evidence shows that non-revenue generating DL programs lead to increased in-person revenue: "Evidence points to the fact that DL increases the turnstile."
    e. *Technology Thoughts* - A recommendation from an ed-tech thought-leader about how to develop capacity and expertise for DL programing: "Test technology in narrow controlled experiments. Allow for the creativity of mistakes."

3. *Practices of Note Primarily for DL/DP at Zoos, Aquaria, and Museums*
    a. *Varying Models* - Approaches vary depending on legacy, funding, mission, geographic location, etc. Most DP currently is traditional DL and shares a common set of foundational principles, assumptions, or features. There are other scattered models including digital badging, teacher professional development, career training, and general audience programs.
    b. *Three Key Components* - There are three major integrated components of DL programing: program design, program delivery, and business model.
    c. *Business Model Overview* - There were mixed reports of whether DL programs were sustainable (bringing in enough revenue to meet expenses) from fees only. Fee for

service was the most commonly reported business model. Equipment purchase was rarely, if ever, considered as part of this calculation. Some organizations report being under pressure to be sustainable and justify every expense while others are supported both philosophically and financially by the organization.

d. *Missions Include DL* - Most organizational administrations and missions were reported as promoting and supporting DL initiatives and programs.
e. *No Knowledge Sharing* - Since there is no central organizing body or group for DL/DP, every institution is reinventing the wheel as they develop their organization's model.

4. *Specifics of DL Program Design, Program Delivery, and Business Models*
    a. *Program Design*
        i. *Live Animals* - Live animals were viewed as a key feature for many.
        ii. *Behind-the-Scenes* - Showing content that cannot be seen by a regular visitor was reported as popular with audiences.
        iii. *Pre and Post* - Supplementary, enriching activities before and after DL sessions were seen as an important "selling point" and competitive feature for some organizations/programs.
        iv. *Interactivity* - Many reported that ideal classroom interactivity comes from reaching one classroom at a time (point-to-point rather than multi-point).
        v. *Educational Standards* - Many programs reported linking their programs to standards (Next Generation Science Standards, Common Core). Meeting elementary school level standards was reported as easiest.

    b. *Program Delivery*
        i. *Equipment Cost* - This was viewed as the most important factor for determining program sustainability for providers.
        ii. *Technology in Classrooms* - School classrooms no longer need expensive equipment and are served by a growing list of software bridge providers at reasonable cost.
        iii. *Online Delivery* - No-cost models such as Google+ Hangouts on Air (synchronous) and ITunes U (asynchronous) were described as not yet mature technologies but growing in popularity.
        iv. *Staffing* - Using both an on- and off-camera person was a common solution with training involving both presentation skills and technology instruction.

    c. *Business Models*
        i. *Marketing* - Content provider competition is growing. Program content needs to be differentiated and original. Marketing is currently informal and word-of-mouth and may need greater emphasis.
        ii. *Budgets and Staff* - Staff for DL and education are sometimes lumped, making program sustainability calculations muddy.

iii. *Sustainability* - Providers reported different degrees of success with program sustainability. Despite this, many institutions support DL/DP initiatives.
iv. *WCS Sustainability* - Three factors at WCS have contributed to an unsustainable DL budget: 1) cuts in school budgets decreased sessions; 2) high cost of maintaining legacy equipment; 3) staff cuts at WCS decreased program sessions and overall participation.

5. *Some Opportunities and Challenges of DL Programing in General*
   a. *Assorted Opportunities*
      i. The potential audience is huge, beyond the region, and even international.
      ii. Informal education programing is poised to become an important contributor in formal education settings.
      iii. Showing audiences things they would not see on a typical museum visit is popular.
      iv. Technology costs are dropping.

   b. *Assorted Challenges*
      i. How to reach potential audiences, which is now achieved almost entirely via word of mouth.
      ii. How to effectively differentiate program content.
      iii. What DL/DP programing types to focus on.

What do the findings mean?

1. *Aligning with the Strategic Plan* - It is important that the WCS Education Department's digital initiatives consider WCS 2020's stated mission and engagement targets as well as the range of digital initiatives in other organizational departments. This will likely diminish internal obstacles while helping recruit internal fundraising interest and support.
2. *Clarifying Terminology* - There are a host of terms describing digital programing including: distance learning, distance education, digital programing, digital learning, digital education, digital engagement. While trivial seeming, it is important that everyone involved in discussions is clear about the labels used and, more importantly, what each category includes or means.
3. *Keeping DL Programs in the Mix* - Distance Learning, such as WCS's past Distance Learning Expeditions, may be one of the digital tools that Education recommends for a specific campaign or other program or initiative, but it is not likely the only digital tool that will be proposed. Close attention will need to be paid to the hardware platform and business model.
4. *Measuring Success* - Within the context of the Strategic Plan's engagement targets (an increase from 3 to 5 million visitors to WCS's zoos and aquarium and 10-fold increase in constituency/people/advocates), Education needs to reframe, clearly define, and promote

engagement metrics that measure “depth” in addition to “breadth.” These metrics will likely be based on dosage, such as touch time or meaningful encounters.

5. *Embracing Planning* - Consider the Mission/Engagement/Investment profile for each digital initiative and keep audiences and outcomes in sight when planning digital programing.
6. *Determining Outputs/Outcomes* - Questions of how many students/schools and other audiences WCS is interested in serving and the resulting knowledge, attitude, and behavior changes in target audiences were not explored as part of this study due to project scope and the assignment of evaluation resources to other topics that were deemed more central to the primary focus.

What did we recommend?

After assessing WCS’s DL programing and collecting data on DL best practices in informal science education settings, evaluators and key Education staff decided that ***the most useful next step would be the creation of a forward-looking digital programing strategy***. It was decided that the plan should go beyond DL (digital field trips) and address the broader range of available DP (digital programing) tools. A short narrative of the plan, which can be distributed as a stand-alone document, can be found in Appendix A. Following are important elements recommended for consideration in the development of the plan. Some have already been taken into consideration, while some are still under consideration.

Future-Focused Digital Learning & Engagement Plan

1. *Use Guiding Questions to Orient Strategy and Implementation Decisions*
    a. What tools/models of digital programing would be most effective at achieving WCS’s most important mission-driven outcomes?
    b. How can these digital programing tools/models, be prioritized, planned, and implemented by WCS?
2. *Align with WCS 2020 Strategic Plan*
    a. The WCS strategic planning process has identified “building a global conservation organization” and “increasing and inspiring conservation advocates“ as primary goals, with a target of growing participation tenfold, to five million.
    b. Movement-making has been identified by WCS as a key vehicle for achieving these goals. Three conservation campaigns were chosen for development (96 Elephants, Blue York, and Nature Play), and implementation of those campaigns has begun.
3. *Support Movement-Making Campaigns*
    a. For these campaigns, WCS’s Public Affairs division is already contributing advocacy-based content, primarily digital in nature, for which it is using web and social media tools and platforms such as email blasts and social media petitions.

b. Education will collaborate on these campaigns, providing unique education-based content, which is distributed using a portfolio of digital tools.
c. Advocacy- and education-based digital programing can complement each other, each contributing compelling content to the selected movement-making campaigns in their own unique ways.
d. Monitor other movement-making organizations (such as World Wildlife Fund, Oceana, and others) and their use of DL/DP.

4. *Utilize Education Department's Digital Toolbox*
    a. As part of this process, Education created a toolbox of digital learning tools that can be customized for specific campaigns. Each campaign could benefit from the use of several tools depending on content, staffing, and budget. Tools include electronic field trips, professional development, digital badging, webinars, and others (see Appendix B).
    b. Digital Field Trips, such as the Distance Learning Expeditions of the past, may be one of the digital tools that Education recommends for a specific campaign. It is likely, though, that the hardware/delivery platform or the business model will be different than it was previously.
5. *Define and Promote Education Engagement Metrics*
    a. Advocacy-based outreach is characterized as primarily "broad," creates inspiration, promotes action-taking, and can reach large audiences. For their outreach, Public Affairs tracks metrics such as web page views, click rates, email captures, and petition signature numbers.
    b. Education-based outreach is characterized primarily as "deep" and builds conservation advocates through greater touch time per person. Education is currently investigating the most appropriate metrics for measuring program effectiveness and impact.
6. *Develop Digital Education Programing Examples*
    a. Digital Programing 2015-16 Calendar - Education created an outline of digital programing activities for the following year, which is part of the narrative Digital Learning and Engagement Plan (see Appendix A).
    b. Blue York Campaign - Education created a chart of possible digital programing activities for the Blue York campaign using the Digital Toolbox. Implementation of some or all of these activities will be coordinated in conjunction with WCS's Public Affairs division. (see Appendix C).

Appendices

Appendix A - Digital Learning & Engagement Plan

WCS Zoos and Aquarium Education:
Digital Learning and Engagement Plan

prepared by Erin Prada, May 2015

Overview

With global population projected to reach 10 billion by the middle of the century, humans will experience an immense need for space and resources affecting every other living thing on the planet. In response to these pressures, the Wildlife Conservation Society (WCS) has committed in its strategic plan (WCS 2020) to activating a diverse global audience that contributes to the conservation of wildlife and wild places by the year 2020.

In support of WCS 2020, WCS Zoos and Aquarium Education is dedicated to inspiring a movement of conservation advocates through learning experiences delivered at our five wildlife parks--and now in the digital sphere. No matter the format, our programs are designed to provide inspiration, build connections between humans and wildlife, deliver science content and skills, and instill the confidence necessary for our audiences to act individually or collectively on behalf of wildlife and the environment.

Thinking about the impact of programs on future conservation advocates, WCS Education is reimagining how it will design learning experiences and engage with audiences. We want our wildlife parks to play a critical role in educating a new generation of conservation advocates. We also want to serve as a resource for learners and teachers, sharing what WCS has learned, and continues to learn, from its experience in education, science, and conservation worldwide.

Digital Learning and Engagement

WCS Education sees digital programing as an important part of this effort. We will devote resources to developing digital learning and engagement programs that complement in-park and community education programs, providing an increased breadth of learning experiences for audiences and creating inter-departmental partnerships. Our digital learning and engagement plans have been designed to align with WCS 2020 strategic goals.

There is no denying that learning continues to become more digital and evolve in ways we can barely imagine. Tomorrow's conservation advocates are growing up fully immersed in digital technologies, providing them *digital fluency*. However, they must also develop *digital literacy* and be able to critically consume, interact with, and produce alternate media in order to be better citizens and effect change in the world when the situation demands.

Considering the urgency of scientific issues, the pace of technology innovation, and the impact of technology on learning, WCS Education recognizes the value of leveraging digital learning and collaborative technologies that are flexible and responsive to evolving digital norms. These tools can be used to deliver self-directed, experiential, social, and distributed learning experiences, which are designed to foster 21st century skills such as, critical thinking, synthesis of information, innovation, creativity, and collaboration. Digital learning programs also offer an opportunity for deepening engagement with the 4.2 million people who visit our wildlife parks annually, as well as engaging with audiences beyond the geographic boundaries of our parks.

All WCS Education digital learning opportunities will emphasize one or more of these focus areas:

Civic Engagement for Children and Teens

- Digital programs designed to build stronger connections to conservation messaging introduced in WCS advocacy-based campaigns such as 96 Elephants, Blue York, etc.
- Programs will target school-aged students through in-school and out-of-school opportunities through digital participatory learning experiences.

Family Engagement

- Digital opportunities and resources designed to help parents connect the dots between school-based education and informal science learning at our five wildlife parks.

Online Professional Development for Teachers

- Digital program opportunities designed for teachers to improve their classroom practice, advance their professional development, and participate in an ongoing, collaborative professional learning community.
- Programs will allow teachers to learn independently through a self-paced format.

Education and Movement-Making

Devoting resources to digital programing also provides WCS Education a unique opportunity to collaborate with the WCS Public Affairs Division, which has chosen movement-making as a key vehicle for achieving WCS 2020 strategic goals. WCS Public Affairs has identified a series of issues-based, advocacy campaigns centered around WCS science and conservation priorities. The first campaigns, which are in various stages of development and implementation, include: 96 Elephants, Blue York, and Nature Play.

Each campaign will be designed to build awareness around current conservation issues, to increase support for key government legislation, and to inspire individuals to take action. Primarily digital in nature, these campaigns will include both advocacy- and education-oriented digital programing components that complement each other and contribute compelling content to the selected campaigns in their own unique ways.

WCS Education will provide learning experiences for each campaign that deepen the level of engagement with campaign issues. Advocacy-based outreach is broad, designed to reach large

audiences, and introduce the issue to the public. Education-based outreach, on the other hand, reaches fewer people, but is "deep" and builds conservation advocates through greater touch time per person. To measure the impact of Education's digital learning initiatives, metrics are being developed that assess "depth" and that are based on dosage, such as total touch time or number and length of meaningful encounters.

Education and the Digital Toolbox

In preparing to design digital learning programs, WCS Education developed a toolbox consisting of digital tools and learning opportunities that will be customized for achieving particular goals and learning outcomes. These tools will also accommodate varying audiences, content, staffing, budget, etc. Some programs might utilize one digital tool, while others might benefit from the use of several. The toolbox includes electronic field trips, digital badges, online courses, webcasts, webinars, and other tools (see Appendix B).

For example, WCS Public Affairs is in the early stages of planning an advocacy-based campaign titled Blue York, which is focused on shifting New Yorkers' relationship with the surrounding seascape. WCS Education identified this campaign as particularly relevant for developing digital programing that supports school-aged children in engaging with WCS science. We utilized the digital toolbox to think through possible programs as described below and in Appendix C.

Digital Learning and Engagement Programs: Blue York Campaign

Following are details about proposed programs for the Blue York movement-making campaign.

- Two Teacher Webinars (November 2015)
  - Dr. Merry Camhi, Director of WCS's New York Seascape Program, will introduce WCS science research activities occurring in the NY Seascape.
  - WCS Coordinator of Professional Development for Educators will share grade-appropriate lesson ideas and projects for incorporating real-world, relevant science into a Common Core-based classroom.
  - Participating teachers will have their students participate in a webcast with Dr. Camhi the following month.
  - One lesson presented during the webinar will detail how to effectively incorporate the live student webcast and a marine scientist into their classroom.

- Student Webcast (December 2015)
  - Dr. Camhi will broadcast live to classrooms describing who she is, what she does, how she came to work in marine science, the important science taking place in the NY Seascape, what we have learned from that science, etc.
  - Students will submit questions for Dr. Camhi in real-time through a Q&A app.

- Electronic Field Trip to the New York Aquarium (Pilot) (January-March 2016)
  - One class with up to 35 students will be able to participate daily.
  - New York Aquarium staff person will broadcast live for a virtual tour of the Glover's Reef Exhibit to illustrate the ecological importance of coral reefs and to compare and contrast tropical coral reef systems to the extensive and complex deep-sea coral formations in Hudson Canyon.
  - Students will interact live with WCS staff.
  - This program will pilot a new model of the Distance Learning Expeditions Program previously delivered from the Bronx Zoo.

- Special Program/ World Oceans Day Fishackathon (June 2016)
  - Youth will be able to register for participation in a one-day event.
  - WCS will join Green Wave and the U.S. Department of State for the 3rd Annual Fishackathon Challenge leading up to World Oceans Day on June 8.
  - This is an international event calling for youth from all around the world, who are interested in coding, to come together and create new applications and tools for mobile phones and devices. These apps/tools can provide real-time information to help fishermen work smarter and safer. It will also allow them to report catches, build capacity for better management, and create networks to improve the monitoring of illegal, unreported and unregulated fishing.
  - WCS will recruit youth through existing programs and partnerships. Connections will be made to challenges faced by fishermen within NY Seascape.

- Digital Badge (Pilot) (June-August 2016)
  - School-aged students will be able to participate in a self-directed learning opportunity outside of school time.
  - Students will earn a digital badge that recognizes their achievements as they explore issues, connect with content, and produce digital media related to NY Seascape science and Blue York campaign issues.
  - Student work will be reviewed by a select group of WCS experts before a badge is awarded.
  - Badges will recognize specific skill development.

Digital Learning and Engagement Programs: June 2015-August 2016
WCS Education has also created a more comprehensive schedule of digital programs using the digital toolbox as reference. This wider plan includes a variety of learning opportunities inclusive of and in addition to those that connect with advocacy-based campaigns.

Summer 2015 (June-August)

- Webcasts
  - 96 Elephants Advocacy Campaign: U.S. Ivory Crush in NYC Times Square, June 19 from 10:30-12:00 EST
  - 96 Elephants Advocacy Campaign: World Elephant Day, August 12 from TBD

Academic Year 2015/2016 (September-May)

- Online Curriculum
  - Pablo Python for K-2 Students
- Special Programs
  - Visionmaker NYC Challenge for After-School Teens
- Webinars
  - 8-Part Series for Teacher Professional Development
  - Blue York Advocacy Campaign: Dr. Merry Camhi
- Webcasts
  - 8-Part Series for K-12 Students
  - Blue York Advocacy Campaign: Dr. Merry Camhi

Summer 2016 (June-August)

- Digital Badges
  - Summer Teen Internship
  - Blue York Advocacy Campaign
- Special Programs
  - Blue York Advocacy Campaign: Fishackathon
- Webcasts
  - Blue York Advocacy Campaign: World Oceans Day

Appendix B - Digital Program Models Toolbox (Program Model Chart)

WCS Zoos and Aquarium Education: Digital Learning Tools																
Digital Learning Tools	Audience/Purpose											Metrics		Funding Sources	In-Practice Example	Tech Design/Delivery Tool Examples
	PROFESSIONAL TRAINING			SCHOOL	INFORMAL						LIVE IN-PARK INTERP	Reach Limited By	Revenue Potential			
	PreK-12 Teachers	WCS AIP Graduate Students	WCS Docents/ Discovery Guides	PreK-12 Students	EC (N-5)	Youth (6-12)	Teens (13-17)	Millenials (18-34)	Adults (35+)	Families	All Ages					
Apps/Online Enrichment	X	X	X	X	X	X	X	X	X	X	X	access, awareness	Y	Crowdfunding, Foundation Grants, Sponsorship, Revenue Sharing w/ App Developer	Project Noah	MIT App Inventor, Hackety Hack!, Tynker
Digital Badges	X	X	X	X			X					access, awareness, support	N	Government Grants, Foundation Grants	Smithsonian Quests: Digital Badging for the Classroom and Beyond	BadgesOS, Mozilla Open Badge Kit
Digital Games				X	X	X	X					access, awareness	Y	Crowdfunding, Federal Grants (NEA, NEH, USDOE, NSF) Foundation Grants (Bill & Melinda Gates Foundation), Sponsorship	Half the Sky Movement: The Game	Globaloria, Tynker, MIT Scratch, Gamestar Mechanic, Minecraft Edu, Game Salad, Game Maker, Aris, Inkle, Pixel Press
Electronic Field Trips				X								access, awareness, program fees, WCS staff availability	Y	Sponsorship, Program Fees	NYSCI Virtual Visits	Blue Jeans, Field Trip Zoom, Web Ex, Polycom, Tandberg
Online Courses	X		X					X	X			access, awareness, program fees, WCS staff availability	Y/N	Government Grants, Foundation Grants, Program Fees	National Environmental Education Foundation: Extreme Weather 101	Articulate, Moodle, MOOC applications (Coursera, Udemy, etc), iTunes U
Online Curriculum				X	X	X	X					access, awareness, curriculum fee	Y/N	Government Grants, Foundation Grants, Revenue	JASON Curricula	N/A
Online Resources	X	X	X	X	X	X	X	X	X	X	X	access, awareness	N	N/A	Smithsonian Q?rius: Teaching Resources - Mummies and Mummification	N/A
Social Media		X					X	X			X	access, awareness, support	N	Crowdfunding, Sponsorship, Foundation Grants	DoSomething.org makes the world suck less	Facebook, Google+, Twitter, Snapchat, Tumblr, eBlogger, YouTube, Vine, Instagram
Special Programs	X			X	X	X	X	X	X	X	X	access, awareness, support	Y/N	Corporate Sponsorship	Cleveland Metroparks Zoo Video Game Design Challenge	N/A
Webcasts	X	X	X	X		X	X	X	X	X		access, awareness	N	Government Grants, Foundation Grants	National Park Foundation Webcasts	Google+ Hangouts on Air, YouTube, USTREAM, Wirecast, Web Ex
Webinars	X	X	X	X		X	X	X	X			access, awareness	Y/N	Government Grants, Foundation Grants, Program Fees	NSTA Web Seminars	Adobe Connect, Blackboard Collaborate, Web Ex

Note: Column B with lengthy text descriptions of each model is not showing in the above image.

Appendix C - Digital Program Models Toolbox for Blue York

WCS Zoos and Aquarium Education: Digital Learning Tools for Blue York Campaign

Digital Learning Tools	Description	Audience/Purpose											Metrics	
		PROFESSIONAL TRAINING			SCHOOL	INFORMAL						LIVE IN-PARK INTERP	Reach Limited By	Revenue Potential
		PreK-12 Teachers	WCS AIP Graduate Students	WCS Docents/ Discovery Guides	PreK-12 Students	EC (N-5)	Youth (6-12)	Teens (13-17)	Millenials (18-34)	Adults (35+)	Families	All Ages		
Apps/Online Enrichment	Apps developed by partner organizations will be used in WCS programs or referenced as a resource. For example, Plastic Soup Foundation's Beat the Microbead App; NOAA's Marine Debris Tracker (existing programing)	X			X		X	X	X				access, awareness	Y
Digital Badges	Students will earn a WCS Digital Badge that recognizes what they have been doing as they explore issues, connect with content, and produce digital media related to NY Seascape science and Blue York campaign issues.				X		X	X					access, awareness, support	N
Digital Games	Digital games developed by partner organizations will used in WCS programs or referenced as a resource. For example, Environmental Defense Fund's "What's the Catch?" fishing game olutionscenter.edf.org/catch-share-basics/whats-catch- NOAA's "Where River Meets the Sea", "Predator Protector", and other games (http://games.noaa.gov)				X		X	X					access, awareness	Y
Electronic Field Trips EFT	WCS EFTs for school aged students to the NY Aquarium's 1.) Glover's Reef exhibit focusing on the importance of coral reefs and as a compare and contrast to the corals of the NY Seascape 2.) Ocean Wonders: Sharks! exhibit focusing on their key importance in New York Ocean Ecosystems				X								access, awareness, program fees, WCS staff availability	Y
Online Courses	N/A												access, awareness, program fees, WCS staff availability	Y/N
Online Curriculum	N/A												access, awareness, curriculum fee	Y/N
Online Resources	Online collection of webcasts, podcasts, lessons, click-through-activities, literary resources, websites, videos etc. to support teaching and learning about seascapes. Some resources will be created by WCS while others will be produced by partner organizations.	X			X		X	X					access, awareness	N
Social Media	Twitter chats focused on NY Seascape issues featuring WCS experts.				X		X	X	X	X			access, awareness, support	N
Special Programs	WCS will partner with Green Wave and the U.S. Department of State for the 3rd Annual Fishackathon Challenge to take place over two days leading up to World Oceans Day.							X	X				access, awareness, support	Y/N
Webcasts	WCS Google+ Hangout on Air live webcast and archive for school aged students featuring WCS NY Seascape staff Dr. Merry Camhi				X								access, awareness	N
Webinars	WCS Professional Development for Teachers live webinar and archive featuring WCS NY Seascape staff Dr. Merry Camhi	X											access, awareness	Y/N

Note: Columns C and D describing learning outcomes and timelines for each model are not showing in the above image.

Appendix D: Distance Learning E-Field Trips in Informal Science Settings
Electronic Field Trips in Informal Science Settings
Best Practice Research - Notes & Comments

Prepared by PEER Associates: Chris Hardee, Michael Duffin, & Associates

May 8, 2015

Overview

The following chart contains notes from phone interview conversations conducted in October, 2014 as part of the research into best practices related to Distance Learning electronic field trips. Responses have been sorted into five broad categories including: Overview, Program Design, Program Delivery, Business Models, and Summary. Primary findings for each of the sections, which are listed in the Final Evaluation Report, are also listed in this appendix at the start of each section.

Digital Educational Programing Overview - View from 20K Feet (from FieldTrip Zoom+)

- There are 17,000 non-profit self-identified museums in the U.S.
- 230 offer DL programing
- About 10% (and growing) of AZA accredited zoos provide distance learning programs
- 30% of schools have access to videoconferencing H323 equipment
- 40% of program administrative costs are paid by program fees
- Technology costs for DL are dropping
- DL software bridge providers are developing marketplaces/business solutions

Overview

Alaska Sealife Aquarium link to DL programs	Laurie Morrow Senior Mgr Education lauriem@alaskasealife.org	**Program description -** Using live interactive video conferencing equipment students can expand their scientific experience via live, multi-media presentations. Using inquiry-based learning, each 55-minute conference incorporates current research programs happening right here at the dynamic Alaska SeaLife Center! The materials for each program include a teacher's guide with specific background information and activity ideas, as well as supplies for the session's hands-on activities.
Columbus Zoo & Aquarium link to DL programs	Becky Nellis Education Manager Becky.Nellis@columbuszoo.org	**Program description** - Visit the Zoo without ever leaving your classroom! The Columbus Zoo and Aquarium utilizes green screen technology to immerse your students in the natural world. Teachers receive a packet upon scheduling their program which includes materials for hands-on activities used during the videoconference. Schools must have access to two-way audio/video teleconferencing equipment that runs at a speed of 384 kbps or higher. For schools without videoconferencing equipment, ask about using a Mac or PC to connect through FieldTripZoom. **Notes** - Started their programing in 1999 having sampled it prior to that

		date. With their original equipment, they taught the program from on-site in the animal exhibit areas. Over the years, they realized that high-quality video and the reliability of the animals was more important to being on-site so they moved the program into a studio setting. Now they use a green screen and most of the animal video is pre-taped, although sometimes they use live animals.
COSI **link to DL program**	Jessy Tackas Manager Interactive Video conferencing videoconferencing@mail.cosi.org	**Program description** - COSI videoconferencing connects your students with scientists, doctors, and experts in their fields with a LIVE interactive two-way experience with your school or from COSI. COSI Interactive Videoconference programs fulfill the Scientific Inquiry and Application Components of the Ohio College and Career Ready Standards and the Next Generation Science Standards. Connect to COSI's award-winning interactive programs through videoconference equipment (Cisco/Tandberg, Polycom, or Lifesize) OR for select programs through any web-connected device (SMART Board, computer, or iPad): 1) Give your students a surgeon's-eye view of a live knee replacement procedure; 2) Have your class view a tape of an actual autopsy narrated by a forensic pathologist; 3) Discuss cutting edge research with professionals in science, math, engineering, and other exciting fields; 4) Learn videoconference etiquette and be professional during a program. **Notes** - COSI is/was leader in the field. Since 2000 they offered single-point connection, then started surgical multi-point program with medical focus with most of program focus on health and medicine.
Indian-apolis Zoo	Josh Dudson Conservation Education Resource Manager	**Program description** - No published description online. **Notes** - They are not currently offering an e-field trip type program.
Memphis Zoo **link to DL program** **press release**	Carla Cook Director of Education ccook@memphiszoo.com	**Program description** - Funded in 2011 by a USDA Rural Utilities Services Distance Learning and Telemedicine Grant, the Memphis Zoo's Education Department was able to make distance learning classes available to 14 schools in rural counties throughout Tennessee. **Notes** - The grant period ended in early 2014 and they say that they are currently upgrading equipment and making plans for their next steps in distance learning.
Omaha Henry Dooly Zoo **link to DL programs**	Elizabeth Mulkerrin Director of Education elizabethm@omahazoo.com	**Program description/Notes** - The Omaha Zoo's distance learning program began in 1999 with long-term funding from a federal Star Grant and brought live programs directly to students from the Lied Jungle, Desert Dome, Aquarium Penguins, Wild Kingdom Pavilion, and the Center for Conservation and Research. The grant financed a full-time employee and the purchase of videoconferencing equipment and a T1 line into the zoo. As part of the grant, free services were provided to all schools in a four-state consortium (NE, OK, IO, KS); they only charged the bridging fee of $50. The grant was renewed after five years at a lesser amount, resulting in a total of approximately 10 years of support, which covered all/most DL costs. Loss of funding several years ago has resulted in a somewhat scaled-back version of the original program. Outdated equipment is forcing the institution to look for funding to purchase a more up-to-date set-up. They are still

		committed to DL and could use their line, bridges and links. But they don't currently promote it on their website.
Phoenix Zoo link to DL programs	Gabby Hebert Director of Education GHebert@thephxzoo.com	**Program description** - Phoenix Zoo Distance Learning broadcasts into your classroom with live animals, engaging activities, and inquiry-based programs – the same quality programming you expect from the Phoenix Zoo, just virtual. All you need is a computer, a projector, and an internet connection and you'll have access to dynamic programming from our Outreach team. 4 programs are listed, K-8.
Shedd Aquarium link to DL programs	Heather Schneider Assistant Director Learning Programs HSchneider@ sheddaquarium.org	**Program description -** Connect Shedd to your classroom and your curriculum to the field with our workshops and resources in STEM (science, technology, engineering and math)! Our programs connect you with your peers and empower your students to develop a deep scientific inquisitiveness. They're great for the everyday teacher as well as for homeschool teachers and informal educators. EARLY SCIENCE LEARNING BADGING: This is perfect for early-childhood educators seeking an engaging professional development opportunity for early-science learning.
St Louis Zoo - link to DL programs	Kim Hoorman Outreach and Distance Learning Coordinator kimHoormann@stlzoo.org	**Program description** - The Saint Louis Zoo presents classes using state-of-the-art Polycom videoconferencing equipment. Connect with us to take virtual tours of various areas of the Zoo and learn about animal adaptations, habitats and conservation programs. All programs are interactive and utilize live animals from our Emerson Children's Zoo, video footage from the award-winning KMOV Channel 4 "At the Zoo" show and other means to create a memorable learning experience. At this time we do not have the ability to broadcast remotely from Zoo exhibits. Requirements for scheduling sites: A minimum connection speed of 384k preferred. We can connect to organizations directly via IP technology to traditional H.323 equipment. For schools without traditional equipment, we can connect to PC and Mac computers using FieldTripZoom. Please visit the FieldTripZoom website for more information, or download a Getting Started Guide (60KB PDF).
ASTC/ CAISE link	Kalie Sacco	The Center for the Advancement of Informal Science Education (CAISE) works in collaboration with the National Science Foundation (NSF) Advancing Informal STEM Learning (AISL) Program to strengthen and advance the field of professional informal science education and its infrastructure by providing resources for practitioners, researchers, evaluators and STEM-based professionals. CAISE also facilitates discussion, connection and collaboration across the ISE field — including in media (TV, radio, and film), science centers and museums, zoos and aquariums, botanical gardens and nature centers, cyberlearning and gaming, and youth, community, and out of school time programs.
AZA	Nettie Fletcher	Results from recent survey with data specific to distance learning. Focusing on synchronous/live web-based learning, there were only 12

		programs that were submitted. Overall, there was 54% response rate to the survey.
Center for Interactive Learning & Collaboration (CILC) **link**	Julie Schildmeyer-Heighway	The Center for Interactive Learning and Collaboration (CILC), established in 1994 as a not-for-profit, specializing in the access to applications and the utilization of video conferencing for live interactive content and professional development, as well as web based collaborative learning environments for K-20 education. CILC provides consulting expertise in videoconferencing, integration, problem based learning projects, school-community partnerships and effective techniques for the delivery and development of quality programs. Visit www.cilc.org to explore the various providers of content and diversity of programs and trainings available.
New Media Consortium (NMC) **link**	Lester Raycell	The NMC was founded October 17, 1993 by a group of hardware manufacturers, software developers, and publishers who realized that the ultimate success of their multimedia-capable products depended upon their widespread acceptance by the higher education community in a way that had never been achieved before.
New York Institute of Technology Education Enterprise Zone (NYIT EEZ) **link**	Stan Silverman	The New York Institute of Technology's (NYIT) department of Technology Based Learning Systems (TBLS) manages the Educational Enterprise Zone® (EEZ). The EEZ is a more than 20 year old confederation of museums, libraries, science centers, cultural institutions, and schools dedicated to the appropriate application of technology to the delivery of informal educational resources to all learners. Since its inception, it has concentrated on curriculum development and the training of institutions through both traditional and electronic means. The power of the EEZ consortium, as well as the myriad capabilities of its individual members, has continued to sustain its mission of supporting such institutions in developing compelling uses of technology that meets their respective needs. There is no fee for participation in the EEZ. Hardware resources are donated by major hardware and software vendors or acquired and made available by NYIT TBLS through various grants. The EEZ is on the leading edge of technological advances, maximizing the capability of technology to link learning communities together.

Program Design

Program Design includes content, features, target audience, etc.

Summary Findings

1. *Live Animals* - Live animals were viewed as a key feature for many.
2. *Behind-the-Scenes* - Showing content that cannot be seen by a regular visitor was reported as popular with audiences.
3. *Pre and Post* - Supplementary, enriching activities before and after DL sessions were seen as a differentiating feature for some.
4. *Interactivity* - Many reported that ideal classroom interactivity comes from reaching one classroom at a time (point-to-point rather than multi-point).
5. *Educational Standards* - Many programs reported purposely linking their programs to standards (NGSS, CC). Meeting elementary school level standards is easiest.

Program Design	**Alaska Sealife Aquarium** - Focus on AK fits with mission. See very few visitors in winter, so e-learning is fundamental part of their program. Don't use Google Hangouts because selling point is connecting to one classroom at a time for direct and engaging interaction. Sign-up month ahead of time and get packet of materials. Used to have careers program with high school counselors and librarians signing up. Time zone differences are issue with audiences from afar; haven't done anything with Europe or Australia, for example. **Columbus Zoo and Aquarium** - Sending out materials ahead of time is crucial to success. Single point is better than multi-point on-demand scheduling. Believe great high-quality, reliable video is important for teachers. **COSI** - Do both live or taped. Scheduling can be a problem; do set days of the week, took some planning, worked out well. Multi-point programs, do mostly HS programs. For every program have related kit of materials, pre-activities, and post-activities, and offer as package. **Omaha Zoo** - Have mobile unit which can be moved anywhere in the zoo and allows for behind-the-scenes programs. Programs feature keepers, curators, and researchers primarily, with education staff playing secondary facilitator role. Teacher surveys report this formula as popular. Do single-point and multi-point programs and like the interaction between the various geographically diverse classrooms. Grant helped provide free services to OK, NE, IA, KS. Looked at curriculum and came up with list of ES to HS programing. Helped to write stds; programs; don't have static classroom, can move, don't have it now, **Phoenix Zoo** - *Have not yet been successful with distance learning. First DL program in 2010, partnership with local school district, community ed, after school program, 6 wks, looking for DL program; 1 hr in classroom with teacher, 20 minutes live from the zoo, customized and trained the teachers; used their equip, internet broadcast live stream, two-way capability feed, teachers interact with chat. Very successful, expanded out to 10 districts that are using that program. Tried expanding out to in-school program with same equipment; having hard time getting schools interested in it.

	Offered free programs in rural communities from grant; chose the internet option because schools can do it; set up times to go to schools and do in-service; only been several weeks. After-school program worked because they of WOM to other districts. *Live person talking with students; one live animal; bring up slides, include quizzes, use pre-recorded videos. For teachers we'd like to connect with webcams; two-way feature which is possible with videoconferencing; then schools need to have a webcam. Haven't done enough programs to be comfortable. Work hand in hand with zoo mobile; currently limited funding for zoomobile. **Shedd Aquarium** - *Live from behind the scenes, connect with the schools, launched last school year. Have few different programs for classrooms. Charge fee for program. Use different technologies and WebX which only needs connection to the internet; schools need same equipment; don't want to require and limit classrooms. Skype and Google Hangout don't quite fit, aren't robust or mature. *Two PD programs for teachers, started last Feb in 2013, first attempt in digital badging. Had hosted workshops for teachers on site, but sometimes difficult for them to get to the museum, fee attached to it; how do we reach teachers and give them access to our resources and remove some of the barriers; this is newer trend; badging has picked up steam with youth; all online program, self-paced; review everything that's been submitted; didn't want to lose the personalized response; 20 non-consecutive hours. *Other badging program is early science learning; first one K-12. Lots of people sign up but don't go deeper; some teachers wait for their school breaks; discontinuing this program, but can share some lessons learned. *Don't teach any of the classes; in partnership with Western IL University; animal and biology related courses, graduate program, and certificate program, facilitated by the university; program is being sunsetted. **St. Louis Zoo** - Programs are live, interactive, with live animals in all programs; also pre-recorded videos of animals out in the zoo. Get a lot of phone call inquiries; they have good reputation, won CILC 3 years in a row *Interactive piece, single point to point connections, others do multi-point; they don't want to take that on, from customer service standpoint, exploring for cheaper cost; 30 minutes is better for younger students, interviews with animals and keepers; document camera of things up close; sometimes interactive PPT; can't be static; one person show is doing everything STLZ- program started Nov. 2006, Lisa Berman, left in 2010, hired 4 yrs into it, need to learn a lot about it; 9 titles, 45 minutes in length, penguins and puffins, most popular, baby animals is now most popular, over 20 titles, STLZ program - customers that we've been doing programs for years, they can request programs, created mathimals program, CCSS, and NextGen sci stds, have instructor who speaks spanish, brisk business; do them live, interactive, live animals in all programs; pre-recorded videos of animals out in the zoo. get a lot of phone calls, they have a reputation, won CILC 3 years in a row **New Media Consortium** - three pronged approach, work with teachers to identify that this is a need; provide teachers with pre-trip resources, canned and challenges; real time experience;

	culminating activity
Audience	**Alaska Sealife Aquarium** - 20 classrooms from Anchorage do multi-day program. We appeal to more than classrooms; one of consistent audiences is retirement homes reached through our CILC posting, which we use for marketing. We reach 7000 students a year and offer 240 sessions per year. **Columbus Zoo and Aquarium** - Programs are oriented towards school groups, most being for the elementary grades although also offer programs for middle and high school. Common perception among teachers is that the zoo is for elementary-aged students. Programs are oriented toward school groups, most are elementary. Zoo is something they do as first-grade field trip. Also offer programs for older students; in MS and HS, they teach many sections. **COSI** - With health/medicine focus, they reach an audience outside the usual, including 43 states, 3 Canadian provinces; some general public on site, some college classes, high school, nothing for lower elementary grades; there's team at COSI that focuses on early childhood. Have reached 36-37K per year; avg number has stayed the same or grown slightly. **Memphis Zoo** - Target grade levels include PreK, ES, MS, as well as general public children, teens, and parents/families. For grant period which ended in 2014, we were limited to middle and high schools named in the grant. Currently upgrading equipment and will focus on all grade levels going forward. **Omaha Zoo** - Programing primarily targeted at elementary schools, although initial programming was created for classes from ES to HS. In last three to four years, have offered approximately 50-100 programs per year with business described as steady. Have schools from CT to CA and have never advertised DL offer. **Phoenix Zoo** - Grades 1-12, with one developed program for each pairing of grades. **Shedd Aquarium** - Teen learning lab opened last year; open space for teens to hang out and interact with stuff and mentors, explore careers in aquatic science, get many requests to shadow people. City of Chicago Summer of Learning in 2014, expanded to city of learning; what can youth build. Mozilla helped kick off badging several years ago. Badging has played a role in the corporate world, more about career skills than content knowledge, asynchronous and individualized, like Merit badges for boy scouts. **St. Louis Zoo** - Researching special needs audiences; working on grant 2 yrs; no other zoo does that; looking at program delivery; 160 responses from teachers of special needs; setting up focus groups. They want the science content, cognitive, social skills and communication for special needs.
Content	**COSI** - One area of focus is health and medicine. **Memphis Zoo** - Conservation topics, population dynamics, and giant pandas are examples of topics for distance learning classes. Use live animals. **Omaha Zoo** - Programing is very flexible since videoconferencing system is mobile and can move to any part of zoo. Elementary schools are currently interested in specific animals, such as penguins, which are extremely popular in NE. They have investigated surgery sorts of programs.

	Phoenix Zoo - Programs based on standards. Adopted stance to teach evolution. Conservation and human impact taught to 7-8 graders. **St. Louis Zoo** - 9 titles, 45 minutes in length; penguins and puffins, most popular, baby animals is now most popular; over 20 titles total.
Educational Standards	**Alaska Sealife Aquarium** - Struggle to hit the standards; easy at ES, harder at MS and HS **Omaha Zoo** - Education staff is very tuned in to aligning with standards at state and national levels and did a lot of work in early days of program. **Phoenix Zoo** - Programs are based on standards. **St. Louis Zoo** - CCSS and NextGen sci stds.
Interactivity	**Memphis Zoo** - Classes have high degree of interactivity when group is conducive. **Omaha Zoo** - Do single-point and multi-point programs and like the interaction between the various geographically diverse classrooms. **St. Louis Zoo** - Sometimes can't see student so rely on teachers to call on students and for other classroom management.
Features	**AK Sealife Aquarium -** Connect from Aquarium tanks rather than a green room; can take equipment out on the floor. **Omaha Zoo** - Can broadcast from anywhere and use keepers, curators, researchers; most evaluations like that. Education staff is behind the scenes; they facilitate, do the intro and are producers more than on-camera. Programs are student driven, not canned and scripted. Classes have asked to reuse.

Program Delivery

Program Delivery includes technology platform, staff needed, staff training, etc.

1. *Equipment Cost* - This was viewed as the most important factor for determining program sustainability for providers.
2. *Technology in Classrooms* - School classrooms no longer need expensive equipment and are served by a growing list of software bridge providers at reasonable cost.
3. *Online Delivery* - No-cost models such as Google Hangout/Connected Classroom (synchronous) and ITunes U (asynchronous) were described as not yet mature but growing in popularity.
4. *Staffing* - An on- and off-camera person was a common solution while training could involve both presentation skills and technology instruction.

Technology	**Alaska Sealife Aquarium** - Use Polycom HD 8002 series; in 2009 hired company in OH to build mobile unit on carriage, would not recommend them, battery pack doesn't work, no shock absorption; mobile unit has DVD player, document camera, video camera, headset; have fantastic provider through UCI work with internets; Exploring software bridges like BlueJeans and FieldTrip Zoom to work with teacher who don't have VC equipment; some classrooms enter through Skype other providers such as NE Aquarium and Seattle Aquarium working with Google Hangout; AK Sealife - fact of life to drop calls, often doesn't take long; NY-NJ area is really busy at certain times of day; teachers get used to a delay; are kids more tolerant; kids are so excited to talk with someone who is not local. **Columbus Zoo and Aquarium** - At start, used Polycom mobile unit, which was not most expensive and not as complicated as some other systems. Then wanted to transition to studio approach, although satisfied with Polycom, they got good offer from Cisco. Use a tri-caster for their green screen, a technology used in schools for school news programing; **COSI** - Have their own bridge technology; figured out how to connect to sites that use Google Hangout; troubleshoot ahead of time; try to connect prior to the program; program with 10 schools connecting; 30 minutes prior; planning is important. **Indianapolis Zoo** - They own videoconferencing equipment which involves a lot of bulky equipment that isn't necessary any more; now with different websites and programs, you can do whatever you want. **Memphis Zoo** - They will be using a Tandberg unit and Cisco Jabber. **Omaha Zoo** - Initial system was Polycom videoconferencing set-up with T1 line into the zoo and ClearSea software, which is multi-platform. They are looking for grants to purchase more up-to-date equipment, such as a laptop and new smaller camera to replace huge old camera, but it's hard to find grants; current equip is down; Have mobile unit which can be moved anywhere in zoo and allows them to present behind-the-scenes programs; work with ESU (Educational Service Units) who became hub for DL in NE rural schools; works on

	tablets. **Phoenix Zoo** - Use CamZone webcams for zoos and aquaria and have had some success with Wirecast software which has capability of live video feed and can pull up and create slides, make easy storyboard; can broadcast and connect through their server link; some success; so far they have used it live person talking with students, one live animal, bring up slides, include quizzes, use pre-recorded videos; for teachers we'd like to connect with webcams; two-way feature which is possible with videoconferencing, then school needs to have a webcam; haven't done enough programs to be comfortable yet. **Shedd Aquarium** - Uses WebX; schools need same equipment; WebX only needs connection to the internet; don't want to require and limit classrooms; Skype or Google Hangout isn't robust or mature enough; FieldTrip Zoom; webcam and audio at schools; link to live behind-the-scenes; use Polycom equipment, works similar to Skype **St Louis Zoo** - Uses FieldTrip Zoom because software can reach out to all schools; H.323 set-up; finished building dedicated studio space. **New Media Consortium** - Google Hangouts and Connected Classrooms serve a narrow end-user approach; when you create an online environment, needs to be project driven; kids are fine with tech flaws; teachers are more particular **CILC** - In the last year and half there is lots of new cross-platform technology with high quality of service; anticipate that 2-3 will rise to the top: 1) Vidyo; 2) Polycom and Cisco have come out with versions (Jabber; ClearSea, Blue Jeans); 3) Zoom (their favorite); 4) FieldTrip Zoom used to work with Education Concepts America related to Vidyo think of him as landlord; 5) Google Hangouts and Connected Classroom, 6) H.323 Polycom, Cisco, Tandberg; 7) Skype and other web-based **NYIT EEZ** - *Blackboard Collaborate, Safari Montage Live, and Moodle to develop lessons for classroom delivery. *Fidelity and technology - people are jumping too quickly into technologies that are not mature yet; some technologies have gotten mature; what's acceptable when you're chatting with your friends is different than when you have 30 kids in the room; during the day when internet traffic is high; kids tolerate the glitches more than adults; teacher makes the decision, though; *Cost - We provide organizations with Blackboard Collaborate and Safari Live; cost is $12K a year for Blackboard Collaborate; for Safari Live need to buy a server for $80K, 16K/ yr; boards have to okay these costs. *License is a big license, web form for requesting sessions, and there is some initial training, if museum has no equip at all; what they say to me affects how much I want to help them perhaps even buying equipment; they can use WebX, Cisco products; if your platforms aren't the same; multiple learning platforms.
Staffing & Training	**Alaska Sealife Aquarium** - Cross-trained 3-5 educators, requires special skill set, look into the camera while you switch. Considered enough of a leader that NPS funded them to do

	workshops in distance learning skills to share best practices; DL involves 3 teams: exhibits, interpretation, and education; 3 full time staff on ed team do DL and grant programs. **Columbus Zoo & Aquarium** - Use one full-time person, between November and March which are months with least number of field trips. **COSI** - Use 2 full time dedicated staff, and 2 other team members each week; training held every year for everyone on staff; introduces everyone to the equipment and troubleshooting; training is 50:50 technical background and educational. **Omaha Zoo** - Programs feature keepers, curators, and researchers primarily, with education staff playing a secondary facilitator role. Teacher surveys have reported this formula as popular. It takes two staff to produce a program, one on-camera facilitator and one person handling behind-the-scenes tech. Training is more oriented toward acquiring technology than presentation skills. There was 1 individual at the start, now there are 2 people, one technical, one presenter. **Phoenix Zoo** - Use 2 people to run the program and monitor the chat, one on camera and one off camera. Have smartboard hooked up. Use staff who are comfortable with the education. Provide media and on-camera training. **St. Louis Zoo** - There's team of 5, 3 part time, 1 full time. For training, they observe programs, get the flow, and then say I'm ready to try it. Little difference with live broadcast.

Business Models

Business Models includes fees for programs, grants, program sustainability, etc.

1. *Marketing* - Content provider competition is growing. Program content needs to be differentiated. Marketing is informal and word-of-mouth.
2. *Budgets and Staff* - Staff for DL and education are sometimes lumped, making program sustainability calculations muddy.
3. *Sustainability* - Providers reported different degrees of success with program sustainability. Despite this, many institutions support DP/DL initiatives.
4. *WCS Sustainability* - Three factors at WCS have contributed to an unsustainable DL budget: 1) cuts in school budgets decreased sessions; 2) staff cuts at WCS decreased reach; 3) high cost of maintaining legacy equipment.

General	**NYIT - EEZ** - *Early challenge was Bronx Zoo, curator of education was not supportive, evidence pointed to the fact that it increased the turnstile. *Problem of perceived worth and over demand; NPS parks of NY Harbor created program for Ellis Island; NPS can't charge and they couldn't meet the demand which was damaging their reputation; Radio Museum tried $50 for program, but didn't calculate the costs; then did cost analysis and number was closer to $100 to recover costs; false expectation and delivery; *Badging is diff issue, built teacher training graduate institute in STEM education, asynchronous learning; $125-$150 range does not seem to be an issue for schools; some like Challenger Center charge more, but hit price frustration; now they're struggling; *Badging, what do badges mean to management; just beginning to look at badging, positive about it if people understand what it means for both parties;
Marketing	**Alaska Sealife Aquarium** - Been working with CILC for 7 years; they serve as clearinghouse to schools of all content providers. **Columbus Zoo & Aquarium** - One of the keys early on was being willing to connect to anyone anywhere to do a demo and get teachers to feel comfortable; if we connected for 15 minutes for free, that was successful. **CILC -** There are hundreds of other content providers; competition is increasing; marketing is becoming more important. **Omaha Zoo** - They have schools from CT to CA and have never advertised their DL offer.
Grants/ Funding	**Alaska Sealife Aquarium** - Original funding for equipment came from larger grant that focused on another project. **COSI** - They receive some sponsorship for some programs; hospital provides some funding for their medical programs; do workshops through NSF; have developed partnerships with

	other aquaria; online is big. **Memphis Zoo** - They received a grant. **Omaha Zoo** - Federal Grant, Star school grants underwrote the first 10 years or so of the program; not as much when renewed; after first 5 years absorbed the staff position; DL was huge with regional NSTA in Omaha; schools can't pay that amount of money. **Phoenix Zoo** - Fee for programs must be break-even at very least; charge $90 for 1 hr; looking for grant funding; need money to provide programs to rural schools; hard time using scholarships. **St. Louis Zoo** - Got grant money in 2013 from Boeing for programs for underserved schools in rural St Louis and IL; grant allowed them to reach out to more schools; doubled the number of programs; got grant for 2014 and an increase to $70K for 2015; Boeing is invested partner; finished building dedicated studio space financed by grant from Tillis Foundation; Columbus Zoo was a great resource for the studio project. ; studio approach would be better option; financed by another grant, Tillis Foundation; program is self-funding otherwise.
# Programs/ Audience Served	**Alaska Sealife Aquarium** - 7,000 students a year, 240 sessions per year. **Columbus Zoo and Aquarium** - They reported offering 236 programs to 7,560 students in the past year (2013?); audience numbers can be influenced by whether the programs are point-to-point or multi-point. **Omaha Zoo** - In the last three to four years, they have offered approximately 50-100 programs per year with business described as steady. They have schools from CT to CA and have never advertised their DL offer; 2011/87 programs, 2013/59 programs, 2014/ 26 programs, 313 for YTD (Oct.)
Fees	**Columbus Zoo and Aquarium** - Charge $150 for standard videoconferencing program but because of budget sensitivity have started to offer webinars at a reduced price of $30 for budget-conscious schools. **COSI** - Some sponsorship for some programs; hospital provides some funding; self-funded; $220 per connection (this includes one kit of program materials). Kits include materials for 30 students (additional kits may be purchased for $65 each - details below). $190 per connection for TWICE members Your TWICE password must be on the reservation in order to receive discount. Click here for TWICE info **Memphis Zoo** - Programs are free of charge. Education Department is funded in part by revenues from those programs plus general zoo revenue. **Omaha Zoo** - Leadership sees zoo as educational resource and believes in minimizing or eliminating fees for educational programs such as field trips and DL. Only charge to schools has been a $50 bridging fee. When Nebraska schools/districts surveyed there have been negative reactions to higher fees, perhaps because they have always received the DL programing at no charge. DL is seen as another way to complement programing and reach larger audiences. Leadership is not willing to invest in programing, though, because it does not generate revenue, which results from their policy/mission not to charge for school

	programing. Only 2 departments bring in money, overnight and fee-base summer day camps. **Phoenix Zoo** - Fee for programs must be break-even at very least; charge $90 for 1 hr; looking for grant funding; need money to provide programs to rural schools. **St Louis Zoo** - grown a lot, 160 for 45 minute; 30 minutes for $95, comparable fees from research, Boeing grant allows them to reach out to more schools; 2015 $70K; self-funding; internal audit **New Media Consortium** - Fee for program is competing against programs being offered for for free. **CILC** - Fee for 45 minute program ranges from $125-$150.
Sustainability and Costs	**Alaska Sealife Aquarium** - Reservation numbers took a plunge this year. When comparing to remaining reservations from the previous years, they are only hoping to add another 15 this year. They will be evaluating this dramatic decline over the summer. DL program is barely sustainable and will lose money this year. They prioritize it because they consider it a valuable outreach tool. However, it is difficult to market. They have in-house programs that are also fee-based, and the profits made from those are used to keep the DL program running. **Columbus Zoo and Aquarium** - Don't come close to meeting the cost of school programing in general; cost of staff, 4 full-time and 1 part-time, is high. **COSI** - Interactive Videoconference program cover expenses and when creating any new programs, they are challenged to maintain a minimum profit of 25%. They partner with various organizations in creating programs, who assist with tasks such as assembling kits of materials. **Memphis Zoo** - Costs include staff time to prepare which is time consuming. **Omaha Zoo** - Paying networking costs for 4 yrs at $900/mo; don't need to pay for the line anymore; now can use their own zoo network so are reevaluating. **Phoenix Zoo** - Not much traction. Have offered about six individual programs since launching a few years ago. In process of figuring out what changes are needed to determine market interest. Price set at $90 for a one-hour session and costs are minimal, need to run a minimum of 5 programs per month to cover direct costs (staffing and technology). Costs include roughly 2 hours of staff time for two people: one to run the equipment and the other to facilitate the program, plus a monthly fee of $95 to host our broadcast. Also have annual fee to upgrade the software which is about $360. Can't answer question of sustainability because of low sign-up, even though we currently have a grant to offer the programs for free in rural communities. Could be at tipping point for DL program traction; have enough staff for slight increase in programing. Afterschool program done in partnership with local school district has been successful. Schools manage technology so cost is unknown. Business model was set up so that individual schools offering the program charge a student tuition rate which varied but was on average around $45 for six-week session. $10 of that came to the Phoenix Zoo and $10 went to the district partner. That model brought in good revenue for the Zoo (we had around

	1,200 students participate each year). Overall model was not sustainable, though, due to school payroll costs: each school needed to pay teachers to run the classroom portion of the program. Looking into revamping that program so that it's scheduled during the school day instead of after school. Can't make it happen without outside funding, so unsure of the potential for its sustainability yet.

Summary

Strategic Plan/Mission	**Indianapolis Zoo** - Zoo board has made decision as part of plan and mission to focus on grounds. **Memphis Zoo** - Currently in next strategic planning process, so future of DL is yet to be determined. **Omaha Zoo** - DL is seen as another way to complement programing and reach larger audiences. A Catch 22 situation exists in that leadership is not willing to invest in the programing because it does not generate revenue, which is a result of mission/policy not to charge for school educational programing. **Phoenix Zoo** - Where does digital fit? Want to embrace it, extending the reach of the zoo. Outreach program to schools is robust, and has been around 30-40 years and is time intensive. Want to provide access for schools who can't easily get to site. Ultimate goal is that schools would have broadcast before coming on a school visit. Looking for funding. Program is basically free. Haven't fine tuned. **Shedd Aquarium** - DL seen as very valuable tool fitting the organizational mission. If trying to connect visitors to the living world, digital helps them connect. DL can show things that visitors don't normally see. Have a coordinator of digital learning position to stay on top of trends and to enhance and expand reach.
Opportunities	**Alaska Sealife Aquarium** - Software bridge was very expensive but now is affordable. They should be able to connect to any classroom cost-effectively. FieldTrip Zoom and BlueJeans provider pay the fee of about $100/mo; used to be 2-3xs higher. Teachers have to sign up for the account but don't have to pay bridge fee. Market is out there and consists of every 5th grade classroom in the country. **Columbus Zoo and Aquarium** - Bringing students to the site who otherwise wouldn't be able to come was seen as key opportunity. DL also allows them to show things that visitors wouldn't normally be able to see, behind-the-scenes activities such as veterinarian work. DL allows you to bring kids to site that can't physically get there or let them see things that they can't see any other way. **COSI** - When I first started in video conferencing 7-8 yrs ago, there were not as many platforms. Now, there are many ways to connect. That's been the biggest change. **Omaha Zoo** - See DL as nice-to-have but not necessary component to their other educational outreach. They also see it as tool that's useful for teacher professional development and things other than traditional e-field trips. Would like to see more, multi-point to reach more people. Nice to have that many groups at one time cause they could interact with one another; have done summits for Antarctica, really cool. DL is a way to do PD; work with some universities doing surgery; be a tool for vet schools; complement other things that they do; could be used for a variety of things. Does Bronx Zoo need partners?

	Phoenix Zoo - Get programing out to whole state and beyond. Use to draw families to come to the zoo. **New Media Consortium** - DL can be used as the gateway to future visits; to motivate visitors to go to the museum, that's where the real experience is. Also set up environment online where visitors can go as individuals, such as Itunes U. Aquarium of the Pacific and NPS have sites on ITunes U, which is growing fast and now has 500 institutions. Searching is all done at Apple; started in 2009, population has grown exponentially. Must include interactive online environment. In early 90s, educational board of Liberty Science Center, had no outreach to schools. Things change. **NYIT EEZ** - DL is poised at the place where the informal education world has an important place in the formal education process. As you unpack the new standards like CC, the opportunity to utilize resources in institutions jump out at you. That's a driver and it's going to increase interest in schools; we've been on a plateau. **St Louis Zoo** - Trend is cutting of field-trip funding in schools/districts.
Challenges	**Alaska Sealife Aquarium** - DL is great product, we enjoy doing it, it has great benefit to people. How do you market on national and international stage. States have done a lot and then stopped; for 2 yrs, they had funding. CILC is one way to reach out nationally, to every school district. **Columbus Zoo & Aquarium** - Making your program stand out was reported as key challenge. **Indianapolis Zoo** - Logistically a challenge. Registration system was labor intensive and problematic; schools can't pay up front online; school districts want the product first and then pay afterwards. Other challenges of tech moving faster and equipment getting dated. **Omaha Zoo** - Sees biggest challenges as trying to do more programs, staying on top of technology, and fundraising. An increase in requests for pre and post field trip materials requires greater investment. Several school principals have been discovered recently taping/transmitting face-time programs from the zoo which has wifi back to their school from the zoo grounds. **Phoenix Zoo** - Getting the word out. **New Media Consortium** - In the non-profit environment, control dangerous experiments and don't adopt until its been tested out in narrow controlled environment; have back-up plans; allow for the creativity of mistakes; culture of creativity promotes failure; branch out and look at things from a different perspective; if it doesn't work, say great! Key piece is evaluation. In higher ed, hybridized learning is one of the big movements that's blossoming, with mixture of online and face-to-face collaboration between professors and students.
Trends	**Alaska Sealife Aquarium** - Everyone is seeing a downturn in e-field trips around the country; hear about this at the ISTE conference (main technology conference on a national level); CILC had a pre-meeting at the conference. **Columbus Zoo & Aquarium** - They've seen decline in the number of programs; 400 programs per yr before recession. In early 2000s there was lots of money for videoconferencing. Tehy're

	now offering offering cheaper webinars; show video in smaller window; don't send out materials; don't have videoconferencing equipment, they have wanted to use Skype. **Indianapolis Zoo** - They have had program for at least 15 years; audience dropped off fairly considerably over the past five years; 50% cut in attendance. Schools don't have funds to pay for because of economy; schools in midwest, funds dried up. Staff at zoo were disappointed;, many schools have come back for many years. There were many positives for the program; people from all over the country and world participated: schools from Mexico; Saudi Arabia, more of an exception; regular programs with Montana; Declining business now, reaching fewer people; successful while it was here, touched schools around the world. Schools want it for free now; NJ school booked 30 programs per yr; no longer funding for DL person. OH school would book 100 programs a year. In the districts, critical factors are cost of the equipment and a champion, one person who really knows how to use it. School field trip prices are very low; teachers want something customized. At its height, classes were outside of region, more than 75 miles away; it was an audience we didn't reach any other way; not a change in the mission; we were turning away DL field trip programs. Biggest demand was for field trips. Teachers weren't aware that DL gave them something unique that they couldn't access in some other way, even a field trip. **Omaha Zoo** - State of NE school districts are going in DL direction; just opened up the program again. Nice service that we provide, reaches out to groups that can't get to the zoo. Not a money maker and never will be. DL is still huge in NE; in other states it's not as important. **Phoenix Zoo** - Nationwide teachers are struggling with what to do with field trips programs; budgets are getting tighter; charges for field trips, have to go through a bid process. Over last two years, you now have to be an approved vendor. Hired a position a year ago who creates our field trips and networks with teachers; has more conversations and is getting better traction. Long-lived programs are doing really well. **CILC** - At tipping point or defining moment in collaborative learning; there are a lot of variables. In '97 the start-up equipment was very expensive. Schools dialed in and paid the long distance dialing charges. Then IP based conferencing started to take hold and things changed. Now there aren't charges each time you made a connection. Quality was not as good; people would forego quality to save money. There was an increase in usage at this time; not just the big guys, but the small ones; influx started and is still happening, flooding the field with content. Now there is real competition; getting harder for the new ones to enter the market. Now there's a lot of content out there; ones that align with stds and set a price range. Tries to get providers to think about what they do online and how they can offer different content? **New Media Consortium** - No longer are teachers expected to be just information providers, they're responsible for creating learning environments. Alan November is teacher in New England into digital technology in education; Horizon Report, so much open content out there; Asynchronous Distribution is new and growing trend. ITunes U at Apple, or students who can't cope with the classroom, resources can be stored and distributed for free in this environment;

	Annenberg has an environment; museums have a platform and presence. This provides perspective on where K-12 is moving and more higher ed. **NYIT** - At beginning, DL had to overcome all the learning curves; some skepticism about fidelity and quality of programs and also about turnstile. Questions about how distance learning relates to the mission statement. Trend was constant curve upward. Now it can be done for 2K, entry cost decreased, and with lower costs interest has increased. In second stage, there was significant growth. With the recession when visitation went down there was surge of activity; DL was only way to connect. At same time, tech shifted again toward webinar and webinar tools, which was enabler. Schools that had been budgeting 20K for field trips now budgeting 1K. Almost immediately Common Core wave, teachers and schools looking for solutions to CC; double-edge sword, must align with CC; admin would reject if it didn't. Third phase is maker initiative, Uncommon Approaches to CC. ZooMobiles, changes the nature of the interaction. How does pedagogy change from the museum perspective; teacher-student interaction; museum in a box, zoomobiles, what kind of manipulatives, how can the experience be different; what does this mean in being able to change the nature of the interaction; change the business models.

Additional Resources

List of other institutions with DP/DL Programs not interviewed:

1. Ann Arbor Hands-on Museum
2. Brookfield Zoo / Chicago Zoological Society (online distance learning and peer support network)
3. Discovery Place Education Studio/Bank of America STEM Center for Career Development (professional development program)
4. Gray's Reef Marine Sanctuary (NOAA interactive distance learning programs since 1994)
5. Liberty Science Center
6. MN History Center
7. Minnesota Zoo
8. Monterey Bay Aquarium (works with Google Hangout)
9. New England Aquarium
10. NY Hall of Science
11. Oregon Coast Aquarium ;
12. San Diego Zoo Global Academy (online courses for zoological profession)
13. Seattle Aquarium
14. TN Aquarium (NOAA Distance Learning Program partnership)
15. Zoo Atlanta (experimenting with the Google+ Hangouts on Air platform)
16. 911 Memorial Museum

AZA Survey 2013/2014 - Distance Learning Contacts

Organization	Name of DL Program	Name:	Email Address:	Open-Ended Response
Bronx Zoo/WCS, N.Y.	Online Teacher Academy	Danielle Zuest	dzuest@wcs.org	Online professional development courses provide unique opportunities to examine the life sciences of zoology, ecology and conservation, through topics including predators, marine biology, habitat ecology, and climate connections. Realizing it's not just what we teach, but how we teach it, these courses elaborate on effective science education practices. Pedagogical studies better equip teachers to facilitate scientific learning and promote STEM

				(Science,Technology, Engineering, and Math) programs and curriculum.
Bronx Zoo/WCS, N.Y.	Distance Learning Program	Danielle Zuest	dzuest@wcs.org	With two-way videoconferencing technology, teachers can take students on a trip to the Zoo without setting foot outside the classroom. Distance Learning Expeditions include several live animal "guests"—lemurs, lizards, owls and more.
Buffalo Zoo, N.Y.	Distance Learning Programs	Tiffany Vanderwerf	tvanderwerf@buffalozoo.org	Programs geared toward school groups about specific zoo/animal/nature/conservation-related topics that utilize IP videoconferencing technology for program delivery.
Columbus Zoo and Aquarium, Ohio	Distance Learning	Danielle Ross	danielle.ross@columbuszoo.org	Visit the Zoo without ever leaving your classroom! Schools must have access to two-way audio/video teleconferencing equipment
Erie Zoo, Pa.	Kiboka Treehouse Distance Learning	heather gula	hgula@eriezoo.org	Distance learning program offered to schools
Greenville Zoo, S.C.	Distance Learning Programs at the Zoo	Heather Miller	hmiller@greenvillesc.gov	This programs allows classes to visit the zoo without ever leaving their classroom! The Greenville Zoo broadcasts videoconferencing programs directly from the special zoo classroom to the school and incorporates a variety of hands-on activities in every class.
Memphis Zoological Garden and Aquarium, Tenn.	Distance Learning	Carla Cook	ccook@memphiszoo.org	Grant funded distance learning classes offered to 14 rural Tennessee schools
Minnesota Zoological	Distance	Carol Strecker	carol.strecker@sta	Interactive video conferencing programs on a variety of animal and

Garden, Minn.	Learning		te.mn.us	STEM-focused topics delivered by a zoo naturalist.
North Carolina Aquarium at Fort Fisher, N.C.	Distance Learning (Invertebrate Program)	Megan Ennes	megan.ennes@ncaquariums.com	Join us at the NC Aquarium at Fort Fisher as we make a splash into learning all about marine life. Find out what in the world an “invertebrate” is and why some critters that swim aren’t considered a fish. Take a trip to the coast without worrying about packing the beach towels and sunscreen as we take a closer look into the many treasures our ocean has to offer.
Omaha's Henry Doorly Zoo, Neb.	Long Distance Learning	Elizabeth Mulkerrin	elizabethm@omahazoo.com	Distance Learning brings live programs directly to students from the Lied Jungle, Desert Dome, Aquarium Penguins, Wild Kingdom Pavilion, and the Center for Conservation and Research.
Phoenix Zoo, Ariz.	Outreach Distance Learning	Gabrielle Hebert	ghebert@thephxzoo.com	Phoenix Zoo Distance Learning broadcasts into your classroom with live animals, engaging activities, and inquiry-based programs – the same quality programming you expect from the Phoenix Zoo, just virtual. All you need is a computer, a projector, and an internet connection and you’ll have access to dynamic programming from our Outreach team.
John G. Shedd Aquarium, Ill.	Live From Behind the Scenes	Joy Kubarek-Sand	jkuba@sheddaquarium.org	Take your students behind the scenes into Shedd’s animal hospital, shark or penguin habitats—without leaving your school! Through our new Live from Behind the Scenes program, Shedd experts, from trainers to veterinarians, and animals will make a virtual visit to your classroom (with easy-to-use WebEx video chat software) for a live 50-minute interactive experience.

References

1. Instruction Technology and Distance Education (Center for Research and Distance Education)
2. Quarterly Review of Distance Education
3. The NMC Horizon Report: 2013 Museum Edition is a publication of the New Media Consortium and the Marcus Institute for Digital Education in the Arts. 2014 edition, 2013 edition, 2013 museum edition.
4. United States Distance Learning Association - Educational Research reports: http://www.usdla.org/Educational_Research_Reports_Center_s/1970.htm
5. Wainhouse Research White Paper: The 2009 Update: Taking the Wraps off Videoconferencing in the U.S. Classroom A National and State-by-State Analysis

Technology & Platforms

The following list is not intended to be comprehensive.

1. Google Hangouts for Distance Learning: http://dlccc.wordpress.com/google-hangouts-for-distance-learning/
2. Google+ Promotional Video about Virtual Field Trips through Google+ Hangouts on Air https://www.youtube.com/watch?v=GDwEjqkgwyI
3. Zoo Atlanta Google Hangouts Tech Guide: http://www.zooatlanta.org/media/file/Hangouts_On_Air_Technical_Guide%20copy.pdf
4. Seattle Aquarium: https://www.youtube.com/watch?v=Yv9KkEMBGKQ
5. Zoo Atlanta
    a. http://www.zooatlanta.org/home/hangouts#fKcz
    b. https://www.youtube.com/playlist?list=PL6A32A0E1CA70C53B
    c. http://www.google.com/+/learnmore/getstarted/case-study/zoo-atlanta.html
6. Connected Classroom (Google Hangouts field trips and community)
    a. http://connectedclassrooms.withgoogle.com/
7. Videoconferencing
    a. Cisco Tandberg
    b. Polycom
8. FieldTripZoom - Software bridge providers, connects schools that don't have videoconferencing capability: http://www.fieldtripzoom.com/
9. Getting Started Guide from St. Luois Zoo: http://www.stlzoo.org/files/8013/4997/4018/FieldTripZoom_Getting_Started_Guide.pdf
    a. http://www.fieldtripzoom.com/Schools.html
10. ITunesU: http://www.open.edu/itunes/

Program Sustainability

Several of the organizations contacted responded to the question about program sustainability by providing additional detailed information about programs, participants, fees, and costs.

Alaska SeaLife Aquarium

Year	# DL Programs (sessions)	# Participants (students, schools)	Length	Fees (per session, bridging, etc.)	Costs (staffing, tech, etc.)	Grants (DL specific funding)
2015 to date	162	4,922	60 min	Avg $174	~$45,000	$8,000 sponsorship
2014	237	6,469	60 min	Avg $172	~$45,000	$8,000 sponsorship
2013	258	7,425	60 min	Avg $172		$8,000 sponsorship
2012	239	7,700	60 min	Avg $169		$8,000 sponsorship
2011	258	7,658	60 min	Avg $161		$8,000 sponsorship
2010	201	5,917	60 min	Avg $154		N/A

COSI

Year	# DL Programs (sessions)	# Participants (students, schools)	Length	Fees (per session, bridging, etc.)	Costs (staffing, tech, etc.)	Grants (DL specific funding)
2014	231 sessions (still adding sessions currently. our year goes July-June)	620 remote currently reserved - still taking reservations 36 field trip groups reserved currently - still taking reservations	60-90 minutes depending on program	$165-325 - depending on program. includes 1 kit of materials. Add'l materials range from $65-105/kit.	Our goal is to maintain a minimum of 25% profit after expenses for all programs.	We have a few program sponsors and an endowment specific to our IVC program.
2013	237 sessions	701 remote reservations	60-90 minutes	$165-325 - depending on program.	Our goal is to maintain a minimum of	We had a few program sponsors and an

		75 field trip groups	depending on program	includes 1 kit of materials. Add'l materials range from $65-105/kit.	25% profit after expenses for all programs.	endowment specific to our IVC program
2012	220 sessions		45-90 minutes depending on program	$165-295 - depending on program. includes 1 kit of materials. Add'l materials range from $65-105.	Our goal is to maintain a minimum of 25% profit after expenses for all programs.	We a program sponsor and an endowment specific to our IVC program

St. Louis Zoo

Year	# of programs	# of participants	Notes
2006	25	Not tracked	Program began in November of this year
2007	96	3341	
2008	106	5327	
2009	113	4510	
2010	96	3734	
2011	36	1336	Staffing and construction affected program numbers.
2012	90	2804	
2013	331	9840	
2014	183	5850	Through September, 2014

Appendix E - Distance Learning Interview Guide

Distance Learning Interview Guide
prepared by PEER Associates
Fall 2014

Provider - Focused

1. History: What's the history of your distance learning programing?

2. Audience: Who are your target audiences and why?
    a. Schools - PreK, ES, MS, HS?
    b. General public - Children, teens, parents/families, YA, A

3. Content: What content have you chosen and why?
    a. Live animals - How do you use live animals?

4. Program Design:
    a. Interface - Describe the interface.
    b. Interactivity - What is the level of interactivity with the audience?
    c. Distinguishing features - Any distinguishing features?
    d. What lessons have you learned over time about what works and what doesn't work?

5. Delivery Method/Technical:
    a. Videoconferencing - What are the pros and cons?
    b. Google Hangout - What are the pros and cons?

6. Training: How are facilitators/presenters trained? Educational pedagogy?

7. Business Plan:
    a. Funding - How has your distance learning programing been funded?
    b. Fees - What is the cost to schools and other organizations?
    c. Costs - What are the costs to you of running this program?
    d. Budget - Is the program self-funding and sustainable?

8. Culture Shift:
    a. Strategic plan - How does distance learning fit into your mission/strategic plan?
    b. Organizational support - How did you build org support and handle roll-out?

9. Distance Learning Community:
    a. Professional visibility -
        i. Are there zoo/aquaria/museum/science center interest groups?
        ii. Is distance learning a topic at any conferences?

10. Challenges: What's most challenging?

11. Opportunities: What opportunities do you see?

12. What advice do you have to offer?

Audience-Focused

1. What are the needs? Why is distance learning a good idea for schools?
2. What are the pros and cons?
3. What works? What doesn't work?
4. Costs?
5. Technology?
6. Field trip trends in schools?