Innovations in Informal Science Education: DinoQuest & DinoQuest Online

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DISCOVERY SCIENCE CENTER

UCI University of California, Irvine

Fast Facts about Discovery Science Center

- Located in Santa Ana, California
- 80,000 Sq. Ft.

<u>At the Center:</u>

- 386,000 annual visitors
- 82,000 annual field trip visitors from schools

<u>In the Schools:</u>

- 120,000 annual students in science outreach programs

Budget: $6,000,000 Earned Income: 82% Contributed Income: 18%

Inspire Youth of Today into Fields of Science

Science Adventure Quests

- Blending Video Game Culture and Physical Exhibits
- Putting Visitors into a Science Adventure Video Game
- $7 Million Expansion at DSC
- Dinosaur Themed

Goals

Create a physical exhibit that blends:

- Natural History Museum Collection,
- Science Center Hands-on Exhibits,
- Video Game Culture,
- Science research “collaboratories”

Create a Cyberinfrastructure for distance learning over the internet.

Engaging and explaining CA Science Education Standards.

Create electronic tracking ability for better evaluation capabilities.

Workforce Development,

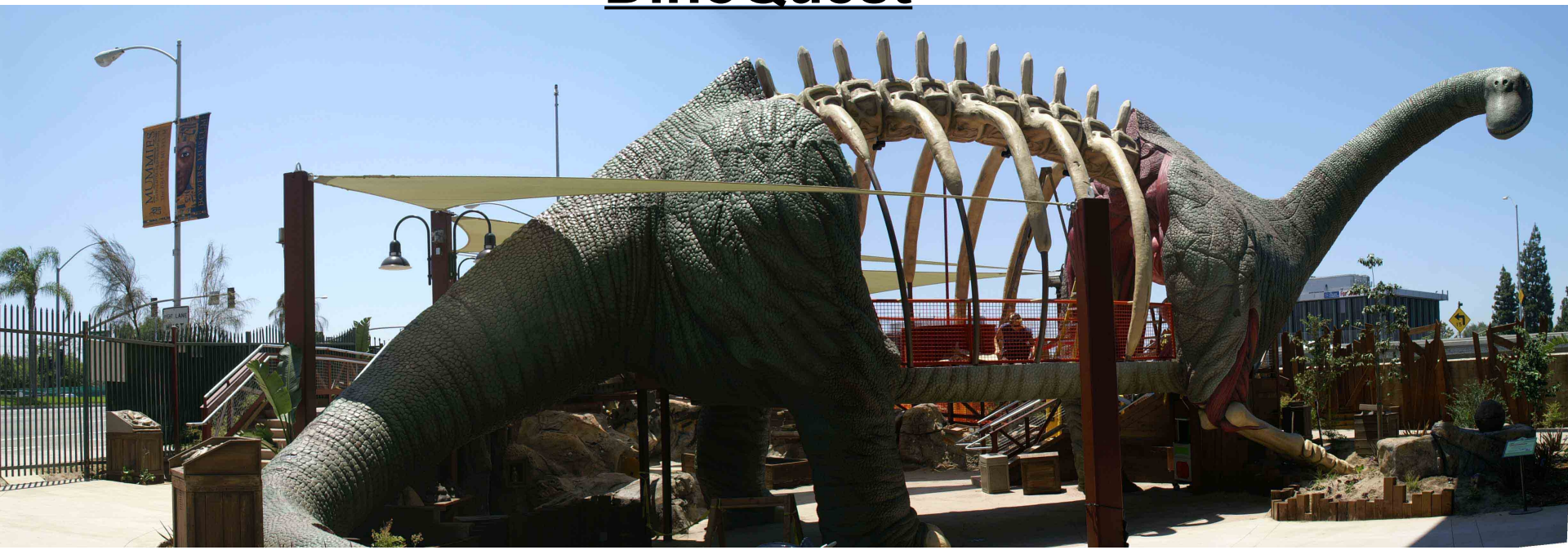
- Introducing scientific and engineering role models,
- Exposure to careers by role playing.

Create a mechanism that continues to drive visitors between a brick & mortar science center and the internet multiple times.

Increase repeat usage of science center exhibits and increase visitation.

Create a replicatable and sustainable model.

DinoQuest



DINO QUEST
DISCOVERY SCIENCE CENTER

&

DINO QUEST
DISCOVERY SCIENCE CENTER
ONLINE

DINO QUEST
DISCOVERY SCIENCE CENTER
THE WORLD'S FIRST INTERACTIVE DINOSAUR ADVENTURE

The IR Transmitter!

- **Picking up information throughout the dig site.**
- **Tracking visitor's success on missions.**

IR transmitter and sensor network technology from Creative Kingdoms, Inc.

Technology:
Embedded Sensors and Transmitter Activation

THE WORLD'S FIRST INTERACTIVE DINOSAUR ADVENTURE

DINO QUEST
DISCOVERY SCIENCE CENTER

TACO BELL DISCOVERY SCIENCE CENTER

1	Students enter into an area where they will select their Infrared Research Transmitter for the Dino Quest.
2	In the registration and training area they will login to the Quest computer system to create a unique, grade specific ID for themselves and learn more about the exhibit and how to use their research transmitter

3	Students will then enter the **Co-Laboratory** where they will select one of six Research Missions and continue their transmitter training.
4	**Quest Stations** are located throughout the exhibit and assist students in learning and successfully navigating through their research mission.

RESEARCH MISSIONS	These are educational challenges that align with the Life Sciences curriculum within the California Science Content Standards at a grade specific level. An example would be a 1st grade student learning about comparative anatomy.
ADVENTURES	Are student rewards after three successful research missions have been completed. They are a more complex challenge that requires the student to apply the science knowledge learned and engage them in thinking and problem solving—science literacy.

Go to Field Station and Select a Mission

8 Educational Missions:

- Aimed at California Science Education Standards for grades K-6
- Mission topics: Predator / Prey, Trace Fossils, Anatomy, Habitats, Identification
- Each mission focuses on a different collaboratory and field of science
- Missions selected, tracked, and completed at networked multi-media kiosks


Field Site

BioMech Lab


Zoology Lab


Habitat Lab

DinoQuest Research Team and Collaboratories: Diverse Science Role Models (ethnicity, age, gender)

Role play (see oneself as a scientist)

After selecting a mission, head out to the dig site!

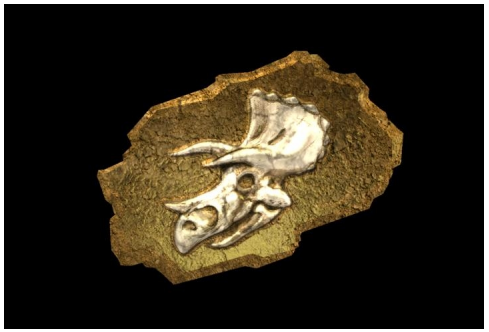
Role play (see oneself as a scientist)

Search dig site and identify objects in the mission.

Computer and sensor network automatically tracks your success.

Video Game Mechanics

Upload data collected to collaboratories via on-site networked kiosks



- Earn Research Points for each item found.
- Obtain fossils with encoded DNA as reward for completing each mission.

Ability to save data and come back another day.

Online Science Learning Games

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- Distance learning,
- Expands on science topics,
- More in-depth science missions,
- Earn points and Dino DNA by completing missions.

DinoQuest Online (released in late September)

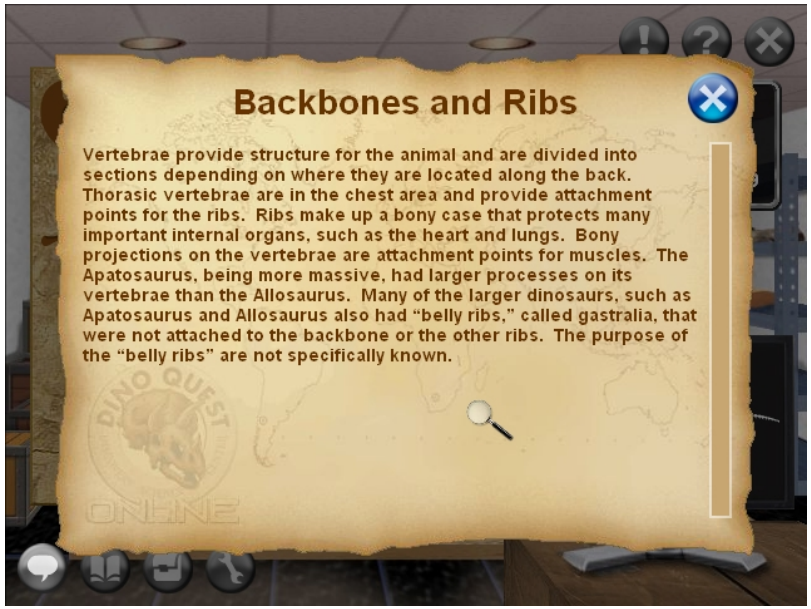
- Log in with password online or from DSC
- Go to each collaboratory

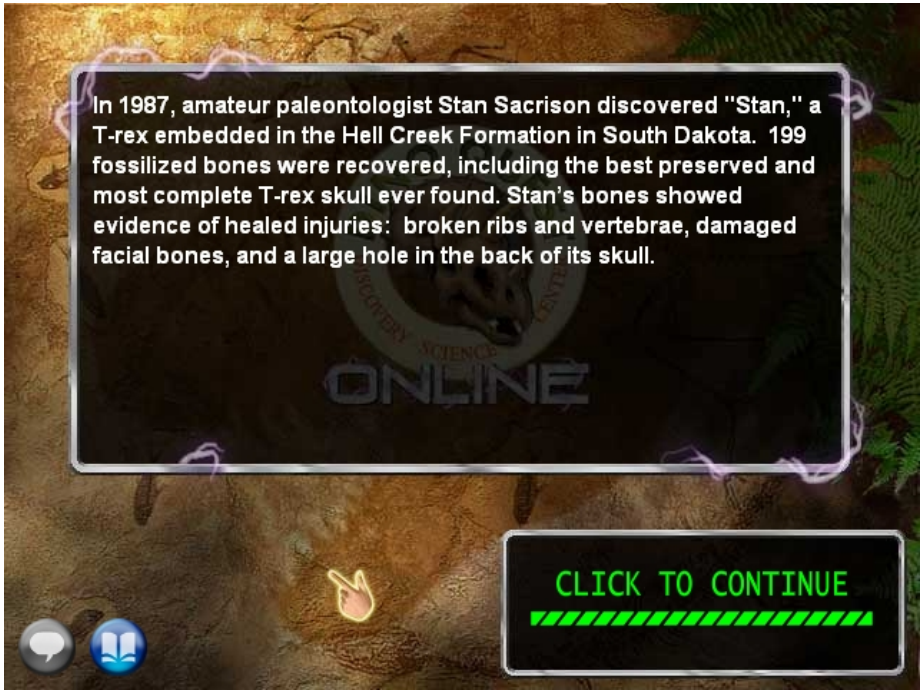
- Same scientists as DinoQuest at DSC
- Expand upon science education standards in each lab

Multiple Science Learning Games: Dinosaur Dig Field Site Collab Game

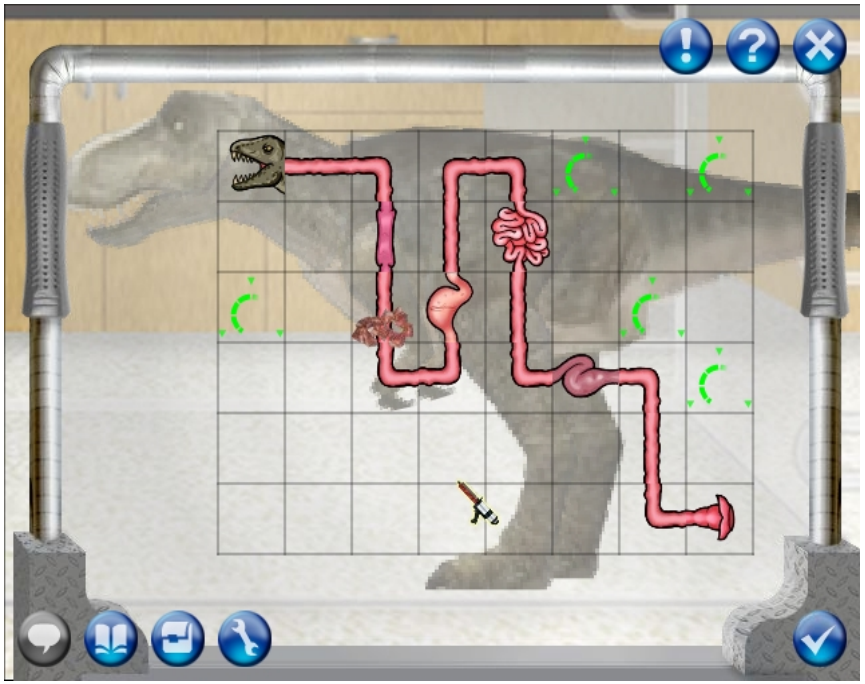
- Different objectives for each game.

Multiple Science Learning Games: Science Education Content



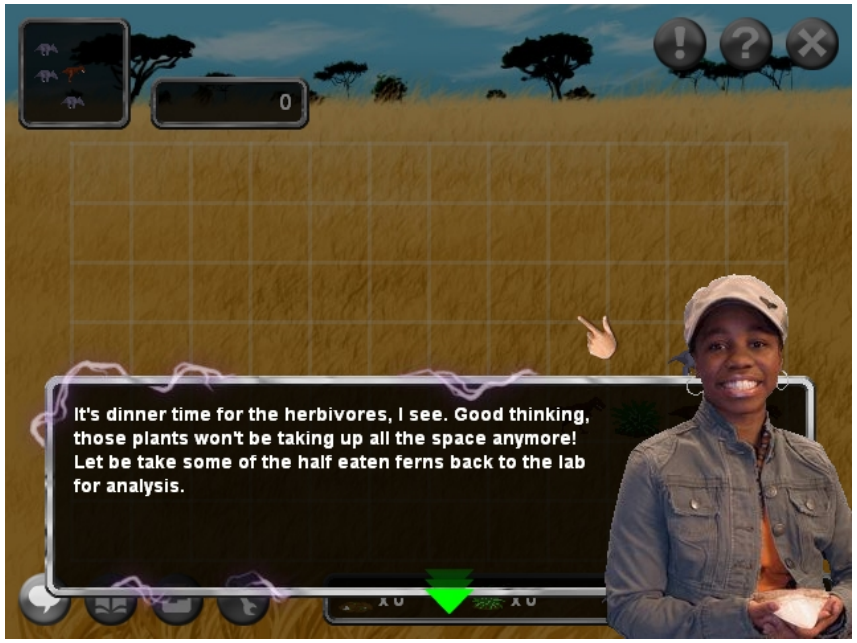


Multiple Science Learning Games: Zoology/Systems Collab Game



- Build a working digestive system out of available organs and “connnectors”
- Move Oxygen and CO2 through a cardio-pulmonary system

Multiple Science Learning Games: Ecology/Habitat Collab Game



• Gain points by matching prey/predator and food chain relations via *Tretis*-like game play

Multiple Science Learning Games: Biomechanical Collab Mini Games

• Mass and balance

• Proportion and speed

•Matching anatomical structures to diet

Multiple Science Learning Games: Resource Interaction Collab Game

MyLab - shows missions completed both online and at the Science Center

DinoSphere – will allow building of your own Dinosaur with DNA collected from missions.

Go back online or to Science Center to obtain different DNA by completing more missions!

Evaluation Potential

DinoQuest and DinoQuest Online allow for the following evaluations:

Player Centered: scores and missions completed identify progress and provide feedback in context.

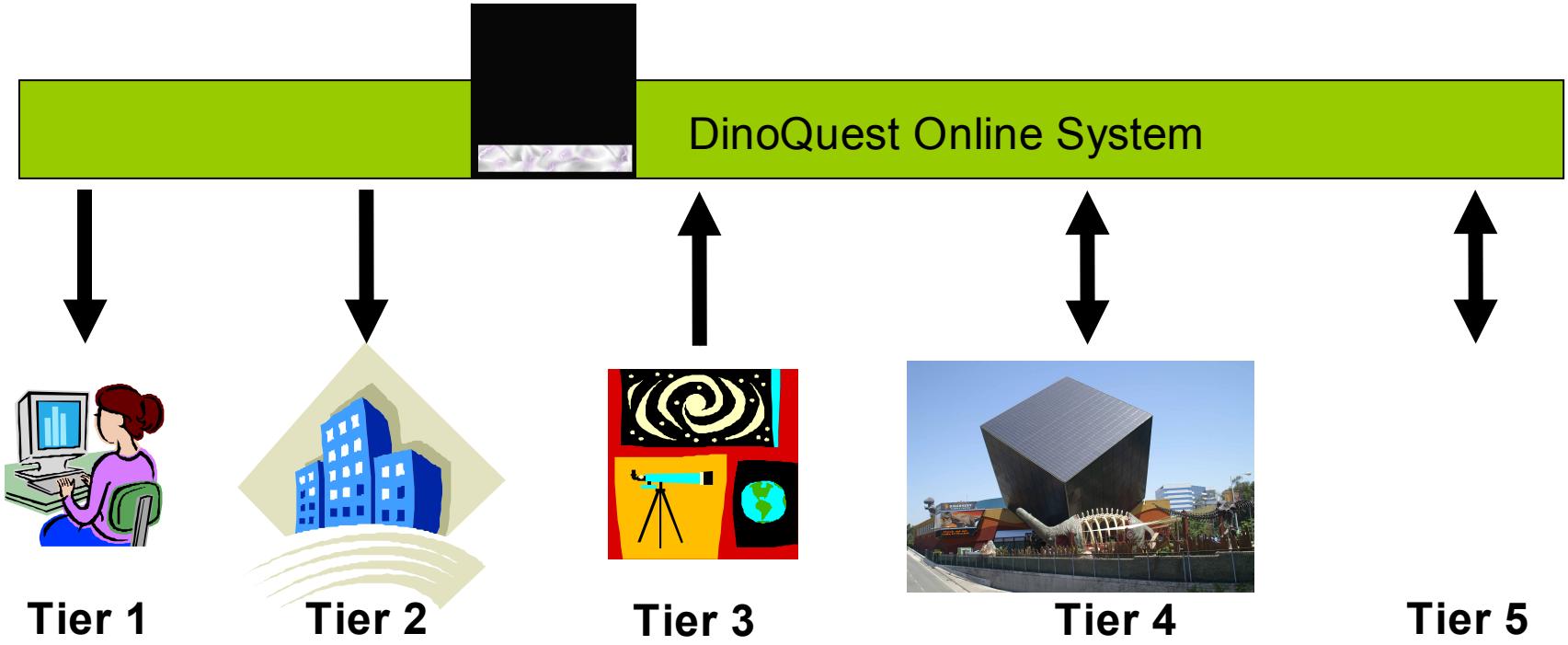
Exhibit Centered: ability to test content comprehension by player quiz upon completing mission.

Challenge the Professor

Independent Evaluation: to ask which method is best and why: physical exhibit,

online learning games, or both?

Cyberinfrastructure for Science Centers



Tier 1: Individual player connection: your internet connection at home.

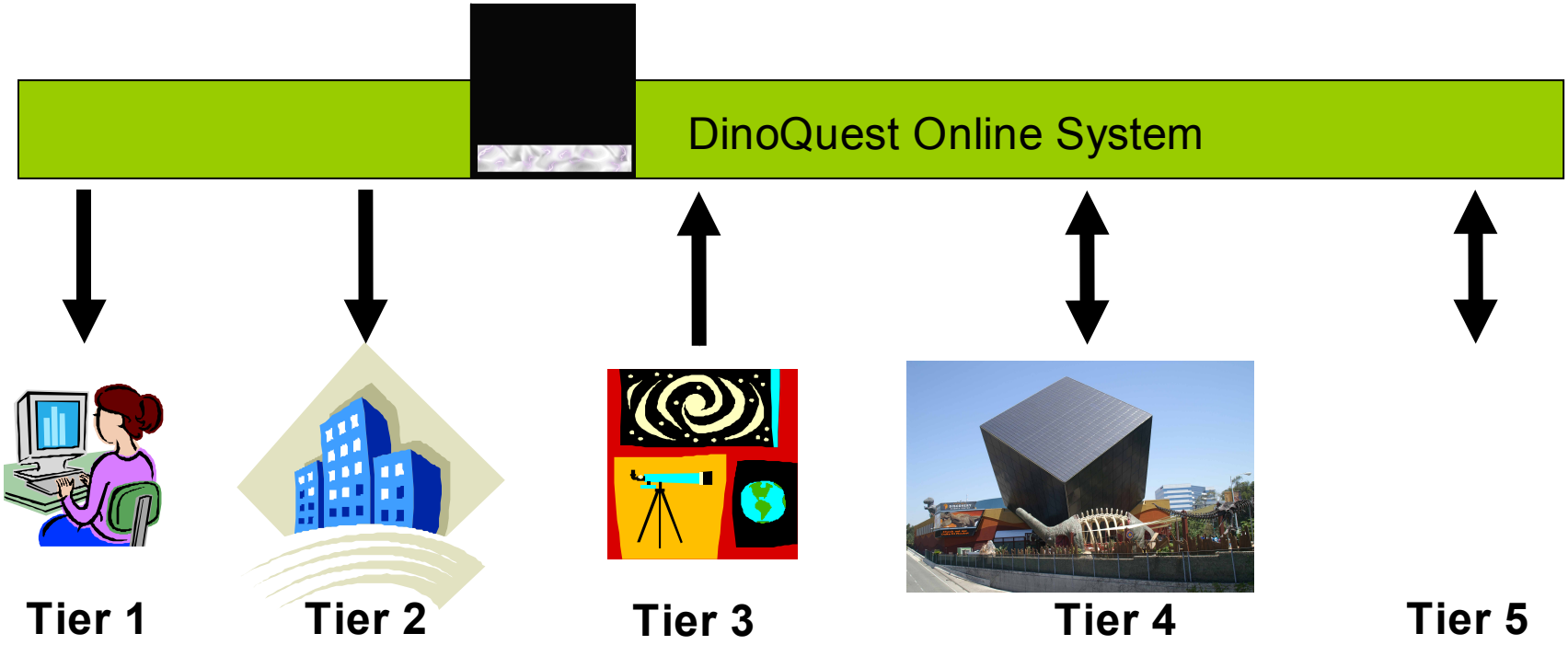
Tier 2: Local institutional player connection: library, science center, school.

Tier 3: Regional science center provides local exhibit content connected online.

Tier 4: “Gateway” science centers provide open interfaces and content.

Tier 5: Science Center Grid: Massive Multiplayer Online Science Learning Games

Cyberinfrastructure for Science Centers



Cyberinfrastructure allows for:

- *Networked Science Centers* across the U.S. (and beyond).
- Can be applied in multiple scientific, technological, or engineering domains
- Can be further developed and expanded w/open source software components, infrastructure, and open content.

Thank You!

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Backup Slides

Project Contributors

- *DSC* – Janet Yamaguchi (VP Education), JoeAnna Jenkins (CFO), Kellee Preston (VP Operations), Leslie Perovich (VP Marketing), Creative Kingdoms Inc., and others
- *UCI* – Robert Nideffer (creative director), Alex Szeto (game programming and art), Calvin Lee (database programming), Celia Pearce (design contributions)

Discovery Science Center Partners and Sponsors

- Ingram Micro
- IBM
- First American Corporation
- Orange County Department of Education
- State of California
- Capital Group
- California State Fullerton, Education Department
- Wiengart Foundation
- 3M Corporation
- Google
- Children's Hospital of Orange County
- UCI Game Lab
- UCI Center for Graphics, Visualization and Imaging Technology
- California Institute for Telecommunications and Information Technology: (Calit2) at UCI-UCSD
- and others

For further information, see http://discoverycube.org

UCI Game Lab Partners and Sponsors

- California Institute for Telecommunications and Information Technology: *Calit2 at* UCI-UCSD
- San Diego Supercomputer Center (SDSC) at UCSD
- UCI Center for Graphics, Visualization and Imaging Technology
- UCI Institute for Software Research
- UCI Arts, Computation, and Engineering (ACE) Program
- UCSD Experimental Game Lab
- Calit2 ACTION Laboratory

- Discovery Science Center, Santa Ana, CA
- Global Center for Research and Development, Daegu, Korea
- National Science Foundation
- Sun Microsystems
- UC Humanities Research Institute
- and others

For further information, see http://ucgamelab.net

Candidate expansions for DSC and beyond:

SLG Enhancements

Challenge the Professor

Additional software content to evaluate individual accomplishment and understanding

DinoQuest Comic Book Creator

Interactively builds comic book of your personal science mission tasks (enhances writing skills)

DinoSphere Online

Create your own dinosaur: Make dinos with DNA

MMOSLG

Massive Multiplayer Online Science Learning Game

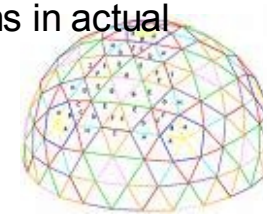
Local Enhancements

Challenge the Professor

Additional software content to evaluate effectiveness of physical/online exhibits

DinoSphere at DSC

See your creations in actual size and interact with them

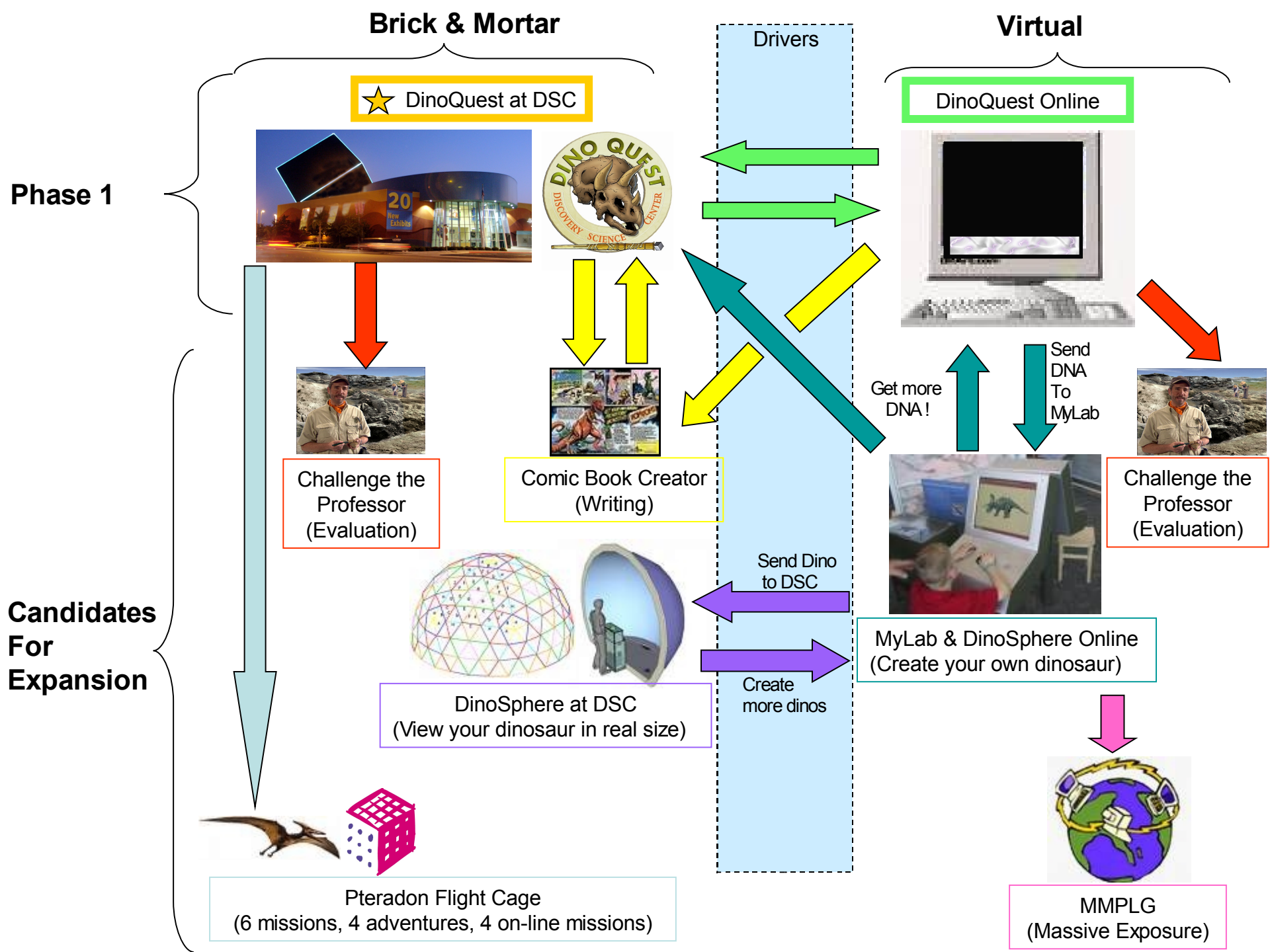


Dinos II (Pteradon Flight School)

Additional Missions

Environmental Ranger Training Station

Additional Science Domains

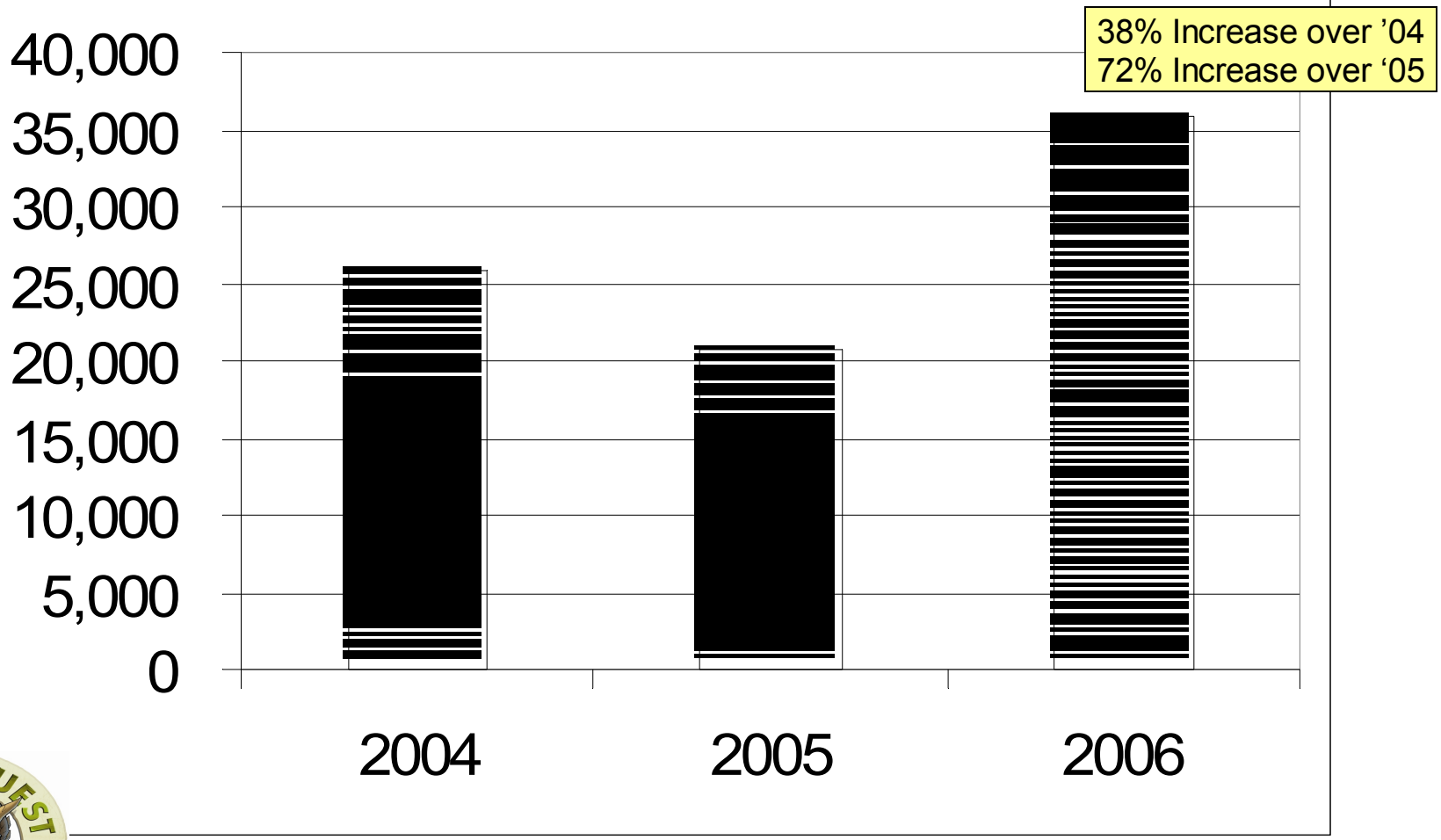

Brick & Mortar
Drivers
Virtual
Phase 1
DinoQuest at DSC
DinoQuest Online
Challenge the Professor (Evaluation)
Comic Book Creator (Writing)
Get more DNA !
Send DNA To MyLab
Challenge the Professor (Evaluation)
Candidates For Expansion
Send Dino to DSC
Create more dinos
DinoSphere at DSC (View your dinosaur in real size)
MyLab & DinoSphere Online (Create your own dinosaur)
Pteradon Flight Cage (6 missions, 4 adventures, 4 on-line missions)
MMPLG (Massive Exposure)

Environmental Ranger Training Station

- Expanded science domains covering water, air, and the environment
- Expanded cyberinfrastructure with additional online science learning games
- Exposure to additional science careers and fields

DinoQuest Results

July 1 – July 23 Attendance



DinoQuest Results

July 1 – July 23 Revenues

Over 2004