

Live, Interactive Planetarium Symposium (LIPS), Notre Dame
7th – 9th August 2012

Hosted by Keith Davis at the 136-seat Digital Visual Theatre, University of Notre Dame

Tuesday, 9th August 2012

IPS Review

A quick summary of the Baton Rouge IPS for those of us that weren't there.
IPS 2014 will be in Beijing.

Mark Webb: What is the audience doing now?

Audience engagement: asking questions/raising hands
"story = engagement" idea

NSC creative (UK company, storytellers, new show "Cell Cell Cell") won best story even though they had no words, only visuals of human life from conception

"Bucket evaluation": "What is the level of satisfaction of the show you just saw?" The audience answers this question on exiting the planetarium and drops a token in one of five buckets (1=poor, 5=excellent)

Imagination can be as powerful as visuals during a show. For example, story themes that include conflicts.

- 1) Hitch-hiking couple meet an unusual, unconventional couple;
- 2) Facebook conversation – current and personal – audience has to choose, or choose not to choose

Two hats: one with questions (e.g., how many?, how big?, etc.) and the other with nouns (e.g., exoplanets, galaxies, planets, globular clusters, etc.) You could rig the questions/nouns so that they are all the same but the audience feels as if they have some input for a show – or you could actually have a random selection. If you don't know the answer, you can always involve the audience in finding the answer via google.

Q&A/comment period:

- Give positive comments for crowd interruptions/questions
- Prepare the audience beforehand (e.g., bathrooms, water fountains, when can they talk, etc)
- Have teachers ask kids to draw something beforehand (to highlight any preconceptions)
- Tie in the bad question to something cultural (e.g., stars heating the summer relate to Dog Star, Sirius, and "Dog Days")

John Kaufmann: Keynote Part 1

It's not canned vs. live, but rather there is a scale between the two extremes.

Status relationship between the presenter and audience is important: consistency, positivity (remember that it only takes once to break your trust with your audience)

Self-intro exercise: My name is... and you'll remember me because...

Noticing the differences when we cross our arms/have arms at our side/have hands crossed in front

Zip-zap-zop: Try to go as quickly as possible, and if something doesn't go quite right, continue as if everything is just fine

Thank you, I've failed (for half the room as they take a bow, and then applause and cheers from the other side of the room)

Noticing exercises:

- Motor-mouthing "I notice..." continuously for a period
- In pairs: "I notice... (about you)", and "Thank you for noticing" or some other positive comment
- Same activity as above, but using the phrase "Aren't you little Miss/Mr...", and seeing how we change our responses

Using a count down to get a group to do something (e.g., form a circle), takes the focus off the presenter – the group is now doing something for/against the time, rather than doing it for the presenter

Asking for volunteers (and then turning your back, to reduce the pressure)

Constellation myth-making: Start, then continue a story, in a circle using the immediately-previous add-on as the thing you connect with and make your own bit of the story out of (this was done by each person starting their segment with "Yes, and...")

"Yes, and...": This was also used to interrupt some audience member who starts telling a story – you redirect rather than correct/interrupt

"1-2-3-ha!" to limit the applause

Goofus and gallant: Role-playing how to take something someone says (e.g., I just discovered a planet!) in a goofus way ("well, I discovered several planets when I was in undergrad"), or a gallant way ("Cool! Tell me about your planet")

Keith Davis: Planetary Motion as a Hands on Activity

Demonstrated a group activity for groups of 3-4 people:

- Each group has a sky chart (laminated), dry-erase markers and a red flashlight
- Planets are observed on the dome by the groups, and their location noted on their sky charts
- Sky fades and reappears 20 days later

- Groups again observe planets, and note their positions – repeated ~15 times (each observation must have a number associated with it)

1st and 2nd times that the groups do this takes quite a lot of time, but then you can speed up.

Once done all the iterations, you ask the group to join the dots in sequence.

Then they confirm their patterns (which should include some retrograde motions), by watching the fast-forwarded version on the dome. Repeat this bit a few times for each planet.

Rob Cockcroft: Astronomical Misconceptions

- see RC's PowerPoint presentation

Discussed audience members' common misconceptions, their origins, why we develop them, how to avoid them in the future, and how to get rid of the old ones. See also Neil Comins book, "Heavenly Errors" (2001)

Wednesday, 10th August

Arthur Bogard: A Colourful World

Reflection vs. emission: Show audience an example by turning off the lights and turning on your cell phones, and then show them the dark sides of planets/moons

Eye cones and rods: Cones for colour (mostly in the centre), rods for fainter light levels (and make up most of the periphery)

Response cones: Red, green and blue; they overlap so for example you can see green with the red cone

Humans are trichromatic, and some animals are tetrachromatic

Colour gamuts: RGB are primary colours of light, whereas cyan-magenta-yellow are primary colours of pigmentation (and secondary colours of light)

Colouring in different lights: e.g., colour dots and black paper, or white paper are fluorescent markers, crayons, paints. Look at the resultant patterns in different lights and finally in white light. Be care not to let drawing be the focus of the activity, but rather the differences produced by looking at the drawing in different coloured light

Hubble Space Telescope use previous demonstration to explain HST's colour calibration talk about HST's false-colour images

Segue into EM spectrum [xkcd on spectrum](#)

For gas spectra: <http://astro.u-strasbg.fr/~koppen/discharge/>

Follow-up activity: Take "Pillars of Creation" archival images, use ESA fits liberator, then photoshop/gimp (use screen function to overlay, with three overlays in RGB)

If you don't have coveights, could use differently coloured flashlights or projectors (or even some used theatre lighting, e.g., from American Science Centre)

John Kaufmann: Keynote Part 2

John became “the Scribe”, who invoked/was possessed by “the Great Leader” (by turning down the lights, using a different voice, and shining a flashlight in his face). The Great Leader told us instructions through the Scribe, but the audience had to repeat her instructions back to the Scribe as the Scribe had no recollection of his possession

“Oh time, oh time, oh time...” to fast forward through time; John encourages throughout

The Great Leader had several tasks that she wanted the community/audience to follow:

- | | |
|------------------------------|---|
| <i>Control the masses</i> | Make up a constellation, and make up a myth with it: “Pacman’s Ghost”, chases you, knows what you think through your computer, rips your head off and puts it into a constellation |
| <i>Conquer the world</i> | – or find a directional cue (we made up this with “The Hammer” and “The Nail”, which we really the Big Dipper and Polaris) |
| <i>Co-opt the culture</i> | The Great Leader wants to be associated with Great Light. We make a new constellation – “Ping Pong Paddle” – and with the Ping Pong Paddle power, the Great Leader hits the Great Light around the sky. |
| <i>Feed the people</i> | “The Seeds” constellation (really the Pleiades) are used: when they disappear (heliacal setting) in early May/end of April, we know to put the seeds into the ground |
| <i>Celebrate the harvest</i> | “Rutabaga Basket” constellation rises |
| Q+A/comment | Cool shadows – could use as “the Great Leader”
Walking a political line
Good for a Halloween show!
Previously, John had recorded the Great Leader parts
So many ways to continue (e.g., write down their own ideas, draw scary pics) to include everyone in the storymaking |

Karrie Berglund: Legends from Around the World

See also PDF of legends told

Recommends Dayle Brown book – shows pictures in the style of the culture. Also, “Beyond the Blue Horizon”, by E C Krup.

Karrie went through several different cultural stories:

Japanese/Shinto – solar eclipse and “amata razu”

Inuit (in Greenland) – Maleena Sun god and Ananga Moon god

Maori

Egyptian

Incan – dark constellations in the MW/flour and dogs to create MW

Estonian – Northern Lights, and MW as a bridal veil

Jaap also added an African story with the Pleiades as a village, Hyades as hunters, Orion’s Belt as antelopes, with a spear at the bottom of the constellation. The hunters won’t collect the spear because of a nearby lion (Betelgeuse)

Karen Klamczynki: Evans and Sutherland Sponsorship Presentation

And demonstration of the Kinect.

By placing triggers around the dome, you can advance your script/take a look into a particular feature.

It's possible to show segments (e.g., pictures, movies, simulations) within a segment.

(Also, Karen deflects jokes about Uranus by saying that the planet was almost called George)

Karrie Berglund (for Kim Small and Julia Plummer): AVI Sponsorship Presentation

See also PowerPoint presented.

Interacting with your audience using a modular planetarium program for ages 7-9 (grades 2-4), based on research for grade 1.

Defining "live" shows:

- Operator asking questions
- Kinesthetic activities
- Use of props (e.g., for Queen Cassiopeia, King Cepheus)
- General engagement
- Audience members asking questions
- Dialogue
- Ask at the beginning "What have you heard in astronomy?", or "Is there anything that you are expecting/want to see?"
- Clap if you want to see Mercury/Venus/Mars...
- Clapping following the Sun's daily path through the sky in the summer vs. the winter, so the kids can *feel* the time difference through the length of time they are clapping.

Combining live and automated shows

Informal centres could have shows that are: people-, place- or culture- centred

LHC in DVT

Quarknet puts high-energy researchers and high-school teachers together

People at Notre Dame work on LHC's CMS instrument

Use "Lite-wave" – a 3D modelling software

Students are actively involved in the project to produce 3D images

Kerry Handron: Using a Virtual World as a Platform for a Live Show

The planetarium community should share with those who are designing virtual worlds

Virtual Egyptian temple tour

More methods for interactivity:

- Imagining you're really there/using present tense
- Mixture of closed- and open-ended questions
- Prompting
- Skit: with volunteers as "the people", the temple priest, Horus and all the other gods: offerings go up the social ladder, and blessings come down

Compare ancient Egypt with the modern day:

- Parading the statue with god in it vs. modern-day parades

- Names on temple columns vs. names on planetarium seats

Goals can include topics on architecture, art, government, religions, connections between societies

“Gates of Horus” A 45-min game for 80 students based on the virtual Egyptian temple tour

Students made more connections in immersive space, it seems, compared to a flat screen (although not necessarily more correct, but a lot more in the amount of material they can later recall and reproduce)

Tikal virtual project Students within groups are assigned roles as team leader, pilot, astronomer, architect, biologist, engineer, and each have different roles
The aim of the project/game is to discover why 80,000 people left Tikal in 100 years (the answer being that they ran out of water)

Other virtual projects Forest, Pompeii, Vari House
Can teach students how to model, and then let them develop the content
Could follow-up with allowing students to download the above Virtual Worlds (or embed the VW into, e.g., Second Life’s sandbox)

Useful website: publicvr.org

Jeff Dunn: Strategies to Keep them Coming Back for More

Jeff is located at the 84-seat Treworgy Planetarium at Mystic Seaport Museum

Getting the planetarium “out there”:

Facebook/twitter
Wordpress blog
Google+
Google forms (and glowstick surveys)
Youtube
Web page
NASA museum alliance
Patch.com (local news feature)
Craigslist
2D barcode
Sponsorship – get it through subscriptions?

Getting social with Amateurs
Local colleges/universities
Coast guard/Yacht clubs
Scouts/Guides (etc)
Retirement communities
Geographic alliance
Naturalists

Offering courses E.g., how to use sextants
Could make them for credit with colleges/universities

Offering free shows to Teachers
Tour guides
Hotels

Extra-dome activities School programs
Observational astronomy
Image processing with micro-observatory (Harvard, Smithsonian, NASA)

Comments/Other ideas: Get your own website that redirects to parent institution
Connect with other museums (e.g., cross-advertising, joint membership)

Put yourself in a community leader position (e.g., on light pollution, or get audience to practice in the planetarium and then they can participate in “Globe at night”)

Mission Moon (from Jaap) – in conjunction with local amateurs, planetarium provides PowerPoint slides and accreditation, amateurs take their telescopes and gain status

Outreach to homeschool groups

Thursday, 11th August

Jaap Vreeling: Cosmology in Interactive Planetarium Shows

Nova team making ALMA receivers, and have outreach and education professionals

They invest in science journalists and teachers (being proactive towards schools)

Education projects/targets:

- Classroom projects
- Educational support
- School projects (e.g., Mission Moon – see end of previous session)
- Mobile planetarium

Reach 6000 primary schools, 650 secondary schools, and take part in events for general public/customized programs (charge 400euros for 08:00-16:00 at a school, including transportation and an astronomer – usually a Masters student)

Goals: What do they remember afterwards? How do we know what they learn?

Show: Start with the sky at night, look at Solar System, then stars, cosmology, and then discuss latest press releases (incorporates 1-2 minute movie clips)

Alternative show: Rather than increasing in size, start with the Universe and go inwards – but inwards with distance or time? – and then end with the sky at night.

Questions for this alternative show:

- Does this work for live interactive shows?
- How does one start from their interests?
- How close are we following the curriculum with this format?

Q+A/discussion

How do you discuss/introduce gravity?

Google “cosmic questions + educators sky + Harvard + NASA” for info (middle school level, grades 7-12)

Powers of 10^4 , to put the Universe’s scale into a mnemonic (the following are all distance scales):

Communist – cities compared to human (i.e., 10 km vs. 1m)

Monkeys – Moon compared to cities

Play – Pluto compared to Moon

Scrabble – nearest stars

Games – galaxies (distance to centre of MW)

Standing – super cluster

Up – Universe’s horizon

Don’t underestimate the planetarium as a resource to put all of the audience’s prior knowledge into a coherent framework!

Arthur Bogard: Round Table Discussions: Funding Both Near and Far

- Funding sources list:
- Crowd sourcing
 - Grants
 - Private donors
 - Business donors/relationships/foundations/sponsorships
 - Gift shops/retail+merchandizing
 - Memberships
 - General admission
 - School admissions
 - Advertising space
 - Tuition – a part of it, anyway
 - Special events (e.g., weddings)
 - Community associations (roadside collection at Christmas)
 - Tax disbursements
- Crowd sourcing:
- e.g., Kickstarter (set a deadline and a minimum, and remember that 2% goes to Kickstarter, 2% to Paypal, and all the different levels of funding prizes have to be worked out)
 - e.g., Indegogo (no minimum)
 - Always have additional things that you'll do if you raise more than you say you will
- Grants
- Don't blanket apply – just do ones you think you'll get
 - Be picky
 - Clearly define deliverables
 - 2-way communication with funders
 - Be careful with your commitment terms
 - Look for twins with underprivileged countries
- Friends-of-_____ community committee (engaging volunteers, like the very successful story at LA Griffith's Observatory)
- Donorschoose.org
- Community members emphasized again!
- Join up with building/refurbishments to defray costs
- Gift shops
- Label it/brand it
 - Only for public (not for school groups!)
 - Online?
 - Popular: astronaut bouncy balls, fundana (bandana with constellations), self-designed stuff that you can't get elsewhere
 - Flop: posters
 - Stay away from large inventory things (such as T-shirts with all the different sizes)
 - Other ideas: Oriental Trading Company, solar shades
 - Go to the community: get local coffee shop to sell "Black-drop effect" coffee, or the local pub to sell "Venusian" beer (this generates advertising, but not cash)
 - Lot of extra work, but could be worth it
- Special events
- Astronomy day
 - Bring in a guest speaker
- Local businesses – let them run the stuff external to the planetarium
- Say "sold out" rather than "show in progress"

Karrie Berglund: Digitalis Sponsorship Presentation

Nightshade 12 coming later this year; beta-release in December, and 31st March 2013 for full release

(end of Rob's notes – he had to leave)

Amy Truksa: The Invited Guest: Bringing Guest Performers to the Planetarium

Amy worked with a local cultural arts group to bring storyteller Jim Cogan to the dome. Uses UV lights and fluorescent gloves and face paint to help highlight his expressions and actions during the stories. Shows were successful and nearly every one sold out. Planning to do this again in the future.

Martin Ratcliffe: Sky-Skan sponsorship presentation

An overview of some of Digital Sky's features, including demonstrations of several molecules and Flo-Viz, modelling particle flows through Earth's atmosphere.

Karrie Berglund: How Do We Know?

This was a presentation of Digitalis' lesson plan by the same name. It explores how we know what we know about our universe by looking at developments in three major eras: Greco-Roman times, the 17th century, and the late 19th century to today.

See the full lesson plan in the download area, or download it from Digitalis' free curriculum webpage:

<http://digitaliseducation.com/curricula.html>

Future of LIPS

LIPS 2013 will be held at Seminole State College in Sanford, Florida by Derek Demeter and Michael McConville. Dates TBD.