Interactivity in your sessions: Give the power to your audience!

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BIOGRAPHIES
Working at RSA Cosmos for almost 20 years, Xavier BLANADET developed the first SkyExplorer and contributed to several software developments. Today at the head of the R & D team, he tries to best meet the needs of our customers in terms of features and innovations.

ABSTRACT
Keeping the audience's attention for a long time is an art. The darkness of the dome doesn’t help. Soliciting the public is then a great way to keep it alert.

It has been a year since the planetarium of the Cité de l'Espace in Toulouse is using the interactivity in their shows. Several unique concepts have been created specifically for this dome.

In this talk, you will discover several possible uses of voting boxes, from the simple vote to the non-linear session, including the estimation of the satisfaction of your audience.

INTRODUCTION
As a manufacturer, we’re moving ideas and concepts to reality. In this process, we need to think about the best way to use a feature.

For everything I will talk about, please remember that I’m not a planetarium user, but a planetarium manufacturer. I don't have specific needs by myself, I'm trying to merge the specific needs of all my customers, and take the maximum benefit of all the solution can do.

I. BUILDING A VOTING BOX

I.1 Technical development
As an introduction I will expose very quickly the different steps of the building process, from the concept to the “first light”.

I.2 Software development
We needed to anticipate the best way to use the voting boxes, to “give the power” to the audience.

We decide to create 5 types of votes. I won’t spend too much time on them, since other people will talk about them.

Just let me explain the philosophy of each type.
I.2.1 Take a decision
After this vote, you get a unique answer (even if nobody answered - even if there is equality). This is the first fundamental brick of the interactive session.

The answer is arbitrary; there is no good or bad answer.

I.2.2 Who wants to ... answer the question?
The purpose of this vote is to have up to 5 possible answers, only 1 is correct.

There is a notion of “good” and “bad” answer. This is an important difference with the previous kind of vote.

This is the exact philosophy of a famous TV game.

Physically, the voting box will give you the result: your answer becomes green if good, red if bad (and the good answer is blinking green).

I.2.3 Quizz
This vote is a generalization of “Who wants to … answer the question”. Very complex things can be done.

When you learn to drive, in France at least, there is an exam where you have to answer 40 questions. The “Quizz” is exactly the same thing.

I.2.4 Buzzer
The philosophy of the buzzer vote is: “The faster, the winner”.

The winner’s voting box remains switched on.

I.2.5 Planetarium control
A particular vote is the fact of controlling the planetarium software.

With this vote, you really give the keys of the dome to your audience!

Example: Ride in the Saturn’rings, Fly across Valles Marineris, or simply control a pointer.

I.2.6 And after the vote?
We offer the software to run a show at some very precise moments.

For instance: when a Quizz ends, you can run a show or another depending on the selected answers. If the audience didn’t correctly answer, you can automatically run a more detailed explanation, this enables you to have better results.

Concerning the “Take-a-decision vote”, the “post-vote script” is the second fundamental brick of the interactive session: depending on the result of the vote, the system will do such thing or such another.
II. INTERACTIVE SESSIONS

II.1 Concept
A standard real time session is 20-40 minutes long. During this part, the animator will talk about many different subjects, according to his own pedagogic organization, choices, culture and so on.

That means that he/she spent some time (hours/days) in brainstorming to find the best and smartest way to explain such and such complex concept (gravity, light, time, ...).

The result is a travel from a point A to a point B, with more or better knowledge in B that there was in A.

In this situation, the spectator is passive, just like any student at school, and the way he will learn will only depend on his/her ability to learn and the experience of the teacher.

The main idea is to let the spectators choose a part of the session by themselves, so that they're implied in the learning process.

The spectator becomes active.

The current mean to achieve this is to choose 1 sequence among N.

Advantages and disadvantages
- Curiosity more satisfied
- Better memorization
- Better profitability for the spectator
- Successfully duty for the planetarium
- Good word of mouth / Loyalty
- Educational interest
- Financial interest
- Less educational coherence
- Poor profitability of the exposed contents relative to the real used ones
- More work to prepare the session

II.2 Prepare the session: a methodology
The first fundamental brick is to “take a decision”. The second fundamental brick is to “automatically run a show”. Using those two bricks will help you in building the interactive session from scratch.

Before exposing this methodology, we need to estimate the effort an interactive session will require to be prepared.

II.3 Theoretical preliminaries
So spectators will choose 1 proposal among N different ones.

Imagine that N is constant and equal to 2.

If spectators are solicited once, that means that the mediator needs to prepare the first half of his session normally. But he needs to prepare 2 different "second-half".

Figure 2 – Interactive session with 1 solicitation and 2 choices

Relative to a standard session, he will work 150% (1+2 instead of 2). That means that only 67% of his work is really effective.

Even worst, if spectators are solicited twice, the mediator will prepare 1+2+4=7 different segments for only 3 finally used (43%).
With 3 solicitations this rate drops down to 27% (15 proposed on the left for 4 finally shown on the right).

And this is with N=2, so imagine with N=5

If we consider the ratio of the prepared sequence over the really-used sequences, the interactive session has a very low one.

If spectators are solicited P times with N choices, then this ratio µ is:

\[
\mu(N, P) = \frac{(P + 1)}{\sum_{i=0}^{P} N^i}
\]

\[
\mu(N, P) = \frac{(P + 1) * (1 - N)}{1 - N^{P+1}}
\]

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Table 1 – Effectiveness of the prepared sequences

The way to read this table is: in all the sequences that I proposed to the spectator, how much did he really saw?

Obviously, the more you want to customize your session, the more work you’ll have to prepare the sections. You can’t build your session at once. You have to find the best compromise and you need to iterate.

Thus the idea is to put one foot in front of the other and to re-use the resources several times, in different sections.

II.3.1 The first interactive session

Today you got a set of Voting Boxes, but you don’t have any sequence or content prepared in order to take benefit of them.
Let's start with a single vote between two different “astronomical” news, to finish your session: “Latest Curiosity discoveries”, and “The gravitational waves”. Each one of those news is a 2-minutes scripted show, live commented.

The week after, you can add a third sequence, talking about a third astronomical news, while keeping the two previous ones of course.

Then, weeks after weeks, you can add some new sequences.

But you only have 5 possible choices – because you only have 5 available buttons. When you reach the 6th vote, you need to kick one of the previous ones, which goes back to your sequence pool and thus remains unused.

This is where it becomes interesting. Because weeks after weeks, you add more sequences and give up others. The more your sequences rotate, the more your pool grows.

Then you can add a second choice. And then here comes the interactive session.

II.3.2 The sequence pool

Now that you have a nice and ever growing sequence pool, you have to organize it, because you'll quickly get confused.

The way you organize your pool is up to you.

This is my pool example (on the next page). Please remember that I'm not a scientific mediator by myself - this is purely theoretical. I chose a mind map to organize my pool.

When you have a more complex pool, you will have to choose the more interesting scripts, depending the latest news. This is the most interesting part of the interactive session: filtering and sorting the pool’s sequences in order to build a show “à la carte”, and walk through them just like in a gamebook.
Figure 5 – Sequence pool example
Figure 6 – Pool extraction
II.3.3 The pool’s life

After several years, you’ll have a nice sequence pool.

You made a script for Rosetta’s launch in 2005. Then, in 2016, you had to talk about Rosetta’s “rendez-vous” in 2016. The comet is still the same, the probe didn’t change, many things are still the same. That means that you have many reusable sequences.

Another example: “Osiris-Rex launch” in 2016, “Osiris-Rex orbit insertion” in August 2018 and “Osiris-Rex sample acquisition” in July 2020. For each IPS, Osiris-Rex offers us new things! But Bennu is still the same.

Then you can just pick up some older sequences from your pool to round off your interactive session.

In the previous example, if you want to talk about the latest news of Curiosity, you can grab 3 other sequences from your existing sequence pool and add a new level to your session.

As a conclusion: the bigger pool you have (and there is no need for it to be so huge), the easier it is to recycle the interactive session bricks to cover the latest news, with less efforts.
III. HELPERS

This part will list some feature that can be used to tune up the way you give the “power to your audience”.

III.1 Group management

The group management enables you to separate your audience in groups.

You can use this in different ways:

- Select only the occupied seats (very useful for adjusting statistics)
- Make a competition (only winners can participate to the next vote)
- “Reds” against “Blues”

III.2 Statistics

The statistics can be used in 2 main uses:

- The result of each vote (keeping results in CSV files for later analysis)
- Specifically ask something to your audience (“Did you like this show?”)

The analysis of the vote results will help you to have a much better knowledge of your audience.

And asking them explicitly their age, their school levels, or so, will help you to corroborate this with the vote results, in order to build more effective shows.

And if you’re a Planetarium Director, you may also be interested by knowing how much the audience liked such show.

III.3 Adjusting / Influencing

When solicited, people will often (always) choose the same thing. If 40% of people are interested in visiting the moon and 60% in visiting mars, 100% of the votes will be “visit mars”. Then “visit the moon” will *never* be chosen and people will never appreciate this part of your work.

The only way to influence the vote is to tease the sequence (with a video preview for instance? Or with a quick description). This will be useful to equilibrate the choice (load balancing). This can also be _before_ the vote, in order to influence it.

IV. EVOLUTIONS AND IDEAS

IV.1 Add programming language for advanced behaviors

We can imagine extending the SDK and accessing directly to the results of the vote using a programming language (such as Python) and taking decisions from the script.

We can also imagine building votes dynamically (the 5 last APODs for instance), or even implementing a serious-game engine using the voting boxes, such as a scientific escape game.

IV.2 More interactivity with audience

We can imagine going further the physical voting box and have a QR code on the Voting Box to be flashed, so that you can “connect” your voting box with a specific app to get your result and stats for instance.

V. CONCLUSION

The voting box system is a very interactive way to give the control to your audience. But this is very time-consuming and requires a hard work in order to build the initial sequence pool.

But after some months, you will be able to take benefit of your rich pool by reusing sequences.

Combined with analysis features, you can offer the way to your audience to customize the show according to their wills, while you’ll learn to better understand them, such as their knowledge, their trends and so on.

Thank you for your attention.