

INDIANA UNIVERSITY

# Project Portfolio Papers

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R542 Instructional Graphics Design

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# Lego Moon Rover Instructional Manual

(Note: I have created only four of the panels for the instructional manual due to the limited scope of this project)

## Audience and Purpose

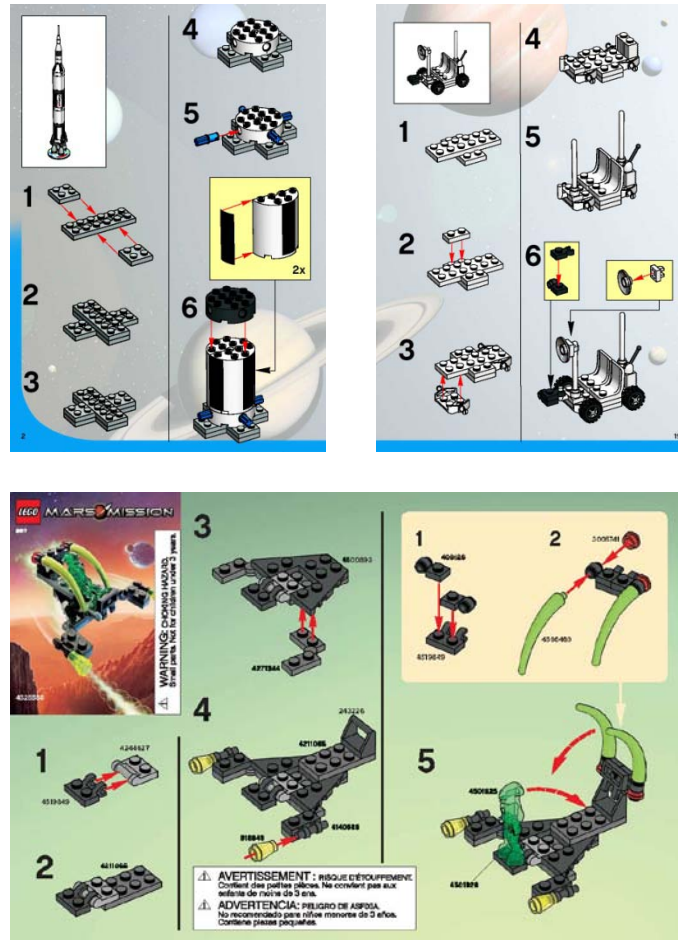
The audience for this graphic is people who play with Lego brand building blocks, ages 3 to 4 and up (I have my own rather large collection). Much of the audience has practice following detailed Lego building instructions. Much of the audience is accustomed to a particular layout and sequencing of the graphics, and expects the graphics to be cohesive with other Lego building instructional graphics. The audience probably considers building Lego objects using instructional manuals to be part of the “playtime” with the toy. Generally, the audience consists of young children whose reading skills vary widely.

The purpose of the instructional manual is to provide step-by-step graphical instructions for building a Lego Moon Rover. The graphics should illustrate changes to the Lego structure in small steps. The graphics should show simple progression from step to step with new Lego blocks added in each step. The panels which I have created are the first, second, eighth and ninth of a total of eleven. The first two panels set the foundation for the structure. The eighth and ninth panels add some important detail blocks to the base of the nearly completed structure.

## Use of Precedent

Lego has created hundreds, if not thousands, of instructional manuals for their products. Each set of toys has at least one instructional manual that goes with it. These manuals follow specific patterns. Generally, graphics of objects are made to be nearly the same size as the objects themselves. The manuals usually include color graphics on thick shiny paper. 3D perspective is used to capture the shape of the object in space. A top/side diagonally angled view of the object is the norm. There is a simple progression from one panel to another, and each step is numbered. Steps are laid out vertically in columns on the page with lines separating the columns. Only very few blocks are added in each step (1-12 or more), and usually all the blocks that are added are able to be seen at least in part.

Many of the manuals created in the last 10 years have backgrounds that reflect the imaginary environment in which the object would be used (i.e. space, a construction site, a Spiderman movie set). Here are several example manuals for space themed Lego sets that were released in the last ten years (the following images are from <http://us.service.lego.com/en-US/BuildingInstructions/default.aspx>, accessed July 19, 2008):



Space themed Lego manuals

The manuals generally include little to no instructional text. Colors used are often matched with the real-life objects, but without gradients or gradient shadowing. Lines are usually used to demarcate boundaries of objects.

## Major Points of Critique

During the development of the graphic, I responded to the following critiques:

1. You might try a horizontal layout of the steps in rows instead of columns and get rid of the lines separating the rows.

Here I am following the precedent set by earlier Lego manuals. I believe the Lego company manual designers made the decision to lay out their manuals this way for several reasons:

- Columns and lines help to chunk the information visually.

- Lines allow for easy differentiation between sections, reinforcing the numbering system.
- Columns and rows may have the same user results, but the toys are often wider than they are tall when they are started, making the earlier panels short and wide, creating either a very thin first row or a first row that has too much wasted vertical blank space. To conserve space and allow for a more balanced layout, a column system is used, allowing for little vertical blank space between earlier panels, and still usually encompassing the width of the entire column (the objects in earlier panels are often as wide as the objects in the later panels).

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2. Five or six blocks being added in one panel seems to be excessive. Is this the norm with Lego manuals?

The norm is anywhere from 1 to 12 or more. The higher end of this spectrum is usually on steps in which several blocks are added parallel to each other. The lower end of this spectrum is usually on steps in which several blocks cannot be added at once due to stacking (unless an inset graphic is included, usually a block on top of a block is never added to an object at once). My object does not add parallel blocks very often, so a high (8-12) range would be unwarranted. Also, none of the blocks being added in my steps are added on top of one another together in one step. Thus, a lower to medium amount of blocks has been added in each step of the manual.

3. Why aren't lines being used on the boundaries of your blocks? Isn't that the norm with Lego?

Yes, this is the norm with Lego manuals. However, Megabloks, one of their main competitors in the small building block sets market uses a difference in color instead of lines on the boundaries of blocks in most instances. I made a design decision early on to follow this precedent instead of the common Lego precedent. This design decision worked well for my product, but it must be admitted that with larger products (like Lego starships, gas stations, etc.) this strategy would not have worked due to the sheer amount of pieces needing to be differentiated from one another. With a small toy, this is not as much of an issue, but when a toy has 300 parts all of a similar color or group of colors, lines become very helpful. Megabloks does not need to use lines because all of their toys have relatively few parts (perhaps 20-80 parts).

4. Couldn't you have taken digital pictures of the toy for a ready reference object during drafting instead of carrying around the object itself or a rough pencil sketch?

I really wish I had thought of this before I finished drafting the manual on computer. This would have been much easier and would have provided a more exact, flexible and unbreakable reference for drawing (I broke my Lego object nearly every time I moved it from place to place, requiring rebuild time in each instance). I feel that this idea would have greatly enhanced the production process.

5. The tires should have had tread on them (this is my own critique of the work, not another's).

I was unable to complete creating the tread on the moon rover tires due to limitations with Illustrator, Microsoft Vista, and my wallet at present. The issue was this: the tire tread had too many edges for Illustrator CS3 to render it on a computer screen (I was 3-4 ridges away from completing this when my computer told me that it had run out of RAM and could not display the object). Apparently, the processing power of modern computers running Vista are not able to render large Illustrator files. This is because Illustrator takes quite a bit of RAM, while Vista keeps a big chunk of it for itself, so that even with a USB 2.0 drive working in the background as an extra 2 GB of RAM (part of Vista's built-in "Ready Boost" technology), the computer wasn't able to keep up with my creativity. Unfortunately, the RAM I am using is close to the max that Vista supports. I guess it's time to spend \$300 on a high-end graphics card.

## **Guidelines/Principles**

The progression of images should illustrate small changes to the structure of the object. There are several reasons for this:

1. The audience is typically very young and may not be able to read instructions, so graphics must be relied on to illustrate the steps.
2. Without text or other outside indicators, it is difficult to figure out exactly which blocks have just been added in the step.
3. Small changes (1-12 blocks) help the user identify all changes quickly and easily.
4. Small changes allow for quick completion of the step, perhaps enhancing motivation ("I'm going through these steps so fast, I'm almost done!")

The graphic should have a feeling of depth. I attempted to achieve this by following several principles concerning depth cues:

1. Overlapping pieces (23)
2. Diminution (back wheels smaller than front)
3. Hazier, less defined background (moon, stars, space) (Chelsea 1997, 22-23).

The graphic should be a close representational approximation of the actual object in size, color, and relationship. I tried as much as possible to draw the moon rover with the actual object in front of me in perspective. First, I created rough perspective sketches of the object on paper which were then used as perspective guides. Next, I developed the drawing in Illustrator from the sketches and often with the actual object in front of me. This continual exposure to the object with a perspective guide helped me to retain some form of realism or “calculated exactitude” in the drawing (Male 2007, 39). This degree of realism is necessary to the user when completing the procedure. The illustrated blocks should look like the real blocks for easy identification.

# Stage Directions Handout

## Audience and Purpose

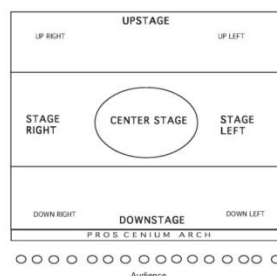
The audience for this graphic is Junior and Senior High drama students, ages 10-20. The students are taking a class on drama, or are in a school play or dramatic presentation. Students may have only a very low reading level. Students may or may not be familiar with drama jargon, and may or may not understand stage directions already. The handout is meant for use in public and private schools, and is to be passed out as paper handouts to each student. The school environment requires a black and white graphic with sparse use of fills in order to cut down on printing costs.

The purpose of this handout is to instruct drama students on stage directions for use in drama class. This is a navigational issue and is important for everyone involved in drama (even the sound person gets cues from stage directions). The graphics in this handout are meant to help students identify and remember (by dual coding, both pictorial and textual) the names of stage directions. The inset graphic is meant to help students remember what part of the stage is up stage and what part is down stage by pointing to the origination of the usage of the phrases. Hopefully, this visual representation of “*ye olde*” stage will help students to visualize the modern stage in a similar way.

## Use of Precedent

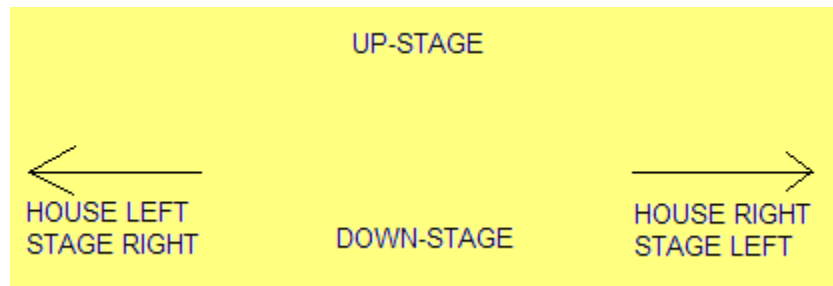
Many diagrams illustrating stage directions have been created which lay out the stage as it would be seen from above. Unfortunately, this is not how a stage is seen by actors. An actor often views the stage from the stage, especially when receiving their stage directions. Usually diagrams lay out the stage from the audience’s point of view (see image below from [http://en.wikipedia.org/wiki/Image:Stage\\_directions.png](http://en.wikipedia.org/wiki/Image:Stage_directions.png), accessed August 20, 2008).

Parts of a Stage



Areas of the stage are named from the actor's point of view, if you are standing on stage looking out at the audience, stage right will be to your right and stage left to your left. Upstage is towards the back wall and downstage is closest to the audience. This terminology comes from the days when stages were raked, or angled down, towards the audience so that everyone standing on the ground could see down our theater seating is usually raked instead. The proscenium arch is the vertical frame around the stage.

In fact, it was difficult to find a single example of a stage directions diagram online that laid out the diagram from the actor's point of view, even though all stage directions are from the actor's point of view. Sometimes the diagram is also filled with many directions (like house left and house right, down stage right, down stage left, etc.), so that the diagram is confusing (see image below from <http://www.cpsd.us/Web/Curriculum/Drama/stage.pdf>, accessed August 20, 2008).



Students in Junior and Senior high would probably be confused by such diagrams. Why, for instance, should the diagram be from above? Only the lighting person would see the stage from this angle. And why have the diagram from the audience's point of view instead of from the actor's point of view? After all, the stage directions are from the actor's point of view. The handout I have created is primarily for actors on stage, and this handout should be given to them while they are on stage. The direction labels are clear and few to avoid confusion.

## Major Points of Critique

During the development of the graphic, I responded to the following critiques:

1. Lines running the length of the stage do not follow true perspective and make the graphic too busy.

I have deleted these lines and tried to correct the invisible perspective lines in the graphic.

2. To improve the focus of the graphic, you should remove the gradient on the arrows, the upper case from the stage labels, and the “amorphous clouds” from the stage direction labels. These details are distracting to the eye.

Each of these has been removed, and this has clarified the message of the graphic.



3. Darken the outline around the actor in order to separate him from the audience.

I have increased the width of the line that outlines the actor. This has not only accentuated his “differentness” from the audience, it has also made the audience fall back into the background. It is easier to focus on the navigational aspects of the graphics now.

## Guidelines/Principles

The two panels are “as short and sequentially independent of each other as possible” in order to facilitate easy access to the information (Fleming and Levie 1993, 44). White space and separation by borders has also been used to help chunk the information. The diagram (direction labels and arrows) has been kept simple, labeled clearly, and explained briefly below the image, following the guidelines of Felker et al. (1981) and Hartley (1987) for creating easily interpreted graphics.

Boldface type has been used for the labels of stage directions in order to indicate the importance of these labels in understanding the purpose of the image. Boldface is a common treatment for showing emphasis, and in the graphic it is used only on the most important labels (the stage direction labels) (Fleming and Levie 1993, 45). I have used a heavy large font on the direction labels and a light medium font on the explanatory text for each image in order to emphasize labels and make the explanatory text more readable in print (Strizver 2001, 55). I have made the larger graphic include all san-serif fonts, and the smaller inset graphic include all serif fonts. This was to be a subtle indication of the separateness of the two graphics in chronology (the inset depicts an ancient stage, so I used a more “bookish” serif font).

I have used line drawings in the images due to several constraints:

1. Printing costs (line drawings use less ink)
2. The handout will possibly be copied and recopied, causing fills and gradients to fade or become distorted
3. Students’ time with the graphic is limited (“Line drawings are most effective in formats where the learner’s study time is limited”) (Pettersson 2002, 117).

I have also tried to use the “smallest effective difference” between line sizes for emphasis (118). For instance, the line that outlines the actor in the graphics is only slightly thicker than the other lines that make up his body and clothing. This slightly thicker line creates a boundary for the figure, but does not distract the eye toward the presence of the line itself.

## Parable VBS Graphic

### Audience and Purpose

The audience for this graphic is vacation Bible school Bible adventure leaders preparing for their daily adventure. These individuals are generally ages 18 and up. They are familiar with the stories of the Bible and may even teach Sunday School regularly in church. The Bible adventure leader creates a Bible setting in a room of the church each night complete with buildings, rivers, trees, rocks, lighting and sound. The Bible adventure leader leads 5-20 elementary school age children through a unique experience in the Bible each night. Whether it is the story of the crossing of the Jordan River or the death and resurrection of Jesus, the leader attempts to create an environment that moves and excites children. In order for the leader to get across the emotion and experience of the Bible story to the children, they should be given a representation of the experience to be conveyed. That is where this graphic comes in.

The purpose of the image is to convey emotion and to illustrate in a dramatic way the details of the environment for the adventure setting. The brightness or darkness of the scene is a visual cue to the leader that the experience should be given in a bright or dark setting. The color of the setting and the apparent emotions of the characters in it helps to get across the expected mood for the leader's future performance. The wetness or dryness of the scene needs to be copied in the real life adventure as close as possible. The scene of the graphic needs to come with its own imbued soundtrack (making the viewer get a mental picture of what the scene must sound like). The picture should communicate clearly an impression of an experience to the viewer.

### Use of Precedent

Group Publishing comes out with new VBS materials every year that are in use throughout the nation. Their materials include images for the Bible adventure leader to see that pertain to the story for each night of VBS. Here are the 2008 leader's Bible point images (images are from <http://www.groupvbs.com/powerlab/biblepoints.asp>, accessed August 2, 2008):



The designers of these images seem to be trying to convey the emotion of the Bible experience by portraying a character or characters in a climactic scene in which they seem to be feeling happy, excited, thankful, scared, or awestruck. Each setting's color, lighting, and ambience is as important as the characters that inhabit it. The color, lighting and ambience of the setting sets the tone for the story's emotional content. The settings in the images becomes a simile of the environment in which the children will experience in the Bible adventure. The Bible adventure leader seeks to reproduce the experiential elements of the graphic in the room of the church in which the adventure is to take place.

I have not sought to copy the style, tone, or coloring of the previous examples, but I have sought similar cohesiveness in my image. I have sought to use color to convey a feeling (in this case, grey and brown). As few details as possible were used to paint the experience yet not distract the eye. Layers of colors on colors were used to create depth of color and a small sense of "being there." I used cartoony likenesses in lieu of exact representations in order to keep the graphic unified with other content intended for use with children.

## Major Points of Critique

During the development of the graphic, I responded to the following critiques:

1. The house in the foreground is too small. If it were larger, more of the "presentness" of the scene might be felt.

I have enlarged the foolish man's house. This actually serves several purposes. First, the scene seems closer, and therefore hopefully more pertinent to the viewer. Second, the layout has greater balance with a larger foreground image. Third, it helps to give a feeling of depth and separation from the house of the wise man.

2. A character should be included to increase the emotional level of the piece.

This point was so clear I feel stupid for not having seen it in the first place. The setting was emotional without any people, but when I added a human to the scene it suddenly seemed more personal in nature. Suddenly this scene was a storm that I was living in with someone else. Someone who was getting wet, whose pain I felt, and whose house I saw was utterly lost. While the first draft of the foolish man was a poor attempt, still the emotion of the scene was increased by his presence.

3. The foolish man should be interacting with his environment. He should strain against the wind, have his hair blown by the breeze, and he should brace himself for the blast of the storm. This would add greatly to the emotion of the scene.

I have tried hard to work with the image of the foolish man and make him seem to interact with the forces of nature. In addition, I have made his face dirty and shadowed by his hand, I have made his clothes stained and wet, and his face full of surprise and concern.

## **Guidelines/Principles**

I have done several key things to make the image more visually appealing in order to gain and maintain learner attention:

1. The image is moderately complex. I have not included superfluous details (like the graininess of the sand, or the waviness of the waves, or the vegetation of the background hills) unless the detail adds to the overall emotion of the scene.
2. I have tried to use drama (both human and natural) to evoke emotion. The lightening and rain and the rising river bring a sense of concern for the situation of the foolish man. The foolish man's ruined house is in sharp contrast to the wise man's house behind him, which sits securely on a high rock out of the way of the river. The foolish man strains with the storm, and with the ruin of his house, seemingly not knowing where to go next or what to do.
3. I have depicted a human, giving the scene a personal nature.
4. The image is in color (not black and white) (Fleming and Levie 1993, 46-47).
5. For the foolish man's face, I have attempted to convey a sense of concern, anxiety, or anger. I have done this by lowering the eyebrows, slightly opening the mouth, extending the lip, and lowering the corners of the mouth, following facial expression illustrations by Scott McCloud (2006, 84-85).

I have also tried to create abundant contrasts and similarities in the picture in order to highlight the drama of the scene. Several contrasts are readily apparent: the ruined house on the beach and the stable house on the elevated rock; the foolish man standing in the storm and the light from the wise man's house shining out of his window subtly indicating that he is safe and dry indoors. Yet both houses are blasted by the storm, the lightening is striking near each, the rain beats upon both. The difference is proximity to the river due to building on the sand or on the rock.

## HTML Screencast

### Audience and Purpose

The audience for this graphic is adult beginning to intermediate html programmers who have a little knowledge about html already, but who would like to know more about how to format their code. The audience would be familiar with html tags, with editing code in simple text editors, and with switching between code and browser views of html. The audience would already understand how html works and would design and edit (or hope to design and edit) Web pages by handwriting the code.

The purpose of the video is to teach html code formatting primarily by examples/nonexamples. The video encourages coders to make editing easier by formatting html as they write it. Viewers are told to indent and add space between elements to make their code clearer and more readable. The purpose of the video is *not* to teach viewers how to write code easier. Although coding is made easier by proper formatting, the purpose of this video is to teach viewers the concept of formatting html code in order to more easily read and edit it.

### Use of Precedent

Tutorials on writing html code abound. Clear, simple, up-to-date tutorials are a little harder to find. One repository for great short text tutorials on writing html is the World Wide Web Consortium's (W3C) own W3Schools (<http://www.w3schools.com/HTML/>, accessed August 2, 2008). These tutorials are easy to access, fully searchable, and are short and to the point. They are a Web developer's best friend (I use them constantly as a reference for code snippets). However, they usually focus more on code examples than on concepts. This is a good strategy for get-in-and-get-out tutorials, but sometimes concepts are important enough that they deserve fuller treatment. I have created my tutorial with this in mind, but have made sure to remain true to the tradition of showing actual code being written and to being short and to the point. I have also tried to present standard concepts that most Web designers would agree with, whether or not they put them into practice all the time. (For example, see Niederst and Freedman [1996, 118] for a discussion of why a Web designer should indent and add space between elements, then look through the example code in their book and see them ignore their own advice in every instance.)

A great storehouse of tutorial videos on formatting html is to be found at lynda.com (<http://www.lynda.com/>, accessed August 2, 2008). lynda.com develops thousands of short video screencasts to teach everything from html and css to Adobe Director and Flash. The teacher talks through the procedure and/or concept while demonstrating examples and nonexamples of the

procedure and/or concept. Code and browser views are shown alternately in the videos. The videos teach very small concepts and procedures or parts of concepts and procedures in short segments (usually 3-5 minutes). I have attempted to follow their lead by keeping my video's concept simple, by trying to speak clearly and interestingly, and by allowing the learner to see how something works by showing them how and why it is done.

## Major Points of Critique

During the development of the graphic, I responded to the following critiques:

1. The presentation is too dry, long, and complex. You have used too much jargon, and have unnecessarily complicated the concept.

In an early draft of the screencast storyboard, the text was extremely boring and full of jargon. In later versions, I have sought to reduce the use of jargon, over wording, and over complexity. I have also simplified the presentation considerably by not teaching similar related concepts (such as chunking information on the page with div elements).

2. Your use of humor is unexpected, erratic, and distracting. Set the tone for your instruction and keep it.

Any humor in the video is unintended. However, I have gone through the video again and edited out any spots I feel that people might think are meant to be funny.

3. From the outset you should let your viewers know what's in it for them.

This project was only intended to contain "up to 30 seconds of animation" (<http://www.indiana.edu/~istr542/bolingsummer08/projects.html>, accessed August 2, 2008), but is already 3 minutes long. This project is not a full lesson, but an instructional graphic. I am clear from the beginning of the video about why the viewer should learn the concept, and the examples/nonexamples make this even clearer. The video is very clear about why the concept is important, and does not seem to require a more developed preamble than what it already has. The point of the project is not to develop an entire instructional segment, but to create a 30 second long interactive instructional graphic.

## Guidelines/Principles

Storyboarding your ideas for videos before production allows for quick feedback and rapid failure. I created a storyboard prior to creating the screencast. In the storyboard, I sketched each shot's image, gave parallel narrative texts and set transitions between segments. This storyboarding helped to keep the complexity of the video down to a minimum and allowed for easier front-end organization and simplification of shots. After rapid prototyping, I found that my storyboard text was horribly boring, full of jargon, and too complex. Thankfully, I had not yet invested a lot of time and effort into it, so editing and rewriting was made simpler than it would otherwise have been had I not developed a storyboard first.

One of the most surprising principles I discovered while producing this graphic had little to do with the graphic itself. Nearly all critiques dealt with the text, not the graphic. While this assignment was to develop an instructional graphic (not a superbly-developed text) I still had the most trouble with the text, not the graphic. People had many suggestions for improving the text, and very few for improving the graphics. I see now that it is impossible (or at least very difficult) to critique a visual when an explanatory audio is playing. And the audio and visual elements are so wrapped together in people's minds that they cannot separate the two if they refer to one another. If my graphic had included no audio, I believe peoples' responses to the video would have been greatly different. I think perhaps that I should have sought feedback on the visuals before I sought feedback on the audio. The audio was supplementary to the visuals as far as the project was concerned, but people find it difficult to turn their ears off. I should have had them view only the visuals first, and only after that both the audio and visuals. Then they could have gotten a more accurate view of the graphics apart from the audio before being exposed to the overwhelming nature of explanatory dialogue.



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