

Magic x Science: ouroboros science theater

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Abstract

The Ouroboros Science Theater was created in 2004 at Federal University of São Carlos as an initiative to publicize the science by theater plays. Since then, more than 150 students participate of the theater group. The Magic X Science play (2006) deals with different points of education and motivation to learn chemistry, using demonstration of experiments on stage at the same time that presents the history of chemistry in an interactive performance with the audience.

The Magic X Science project was experienced by 40 students along these 8 years, and it was presented around Brazil more than 100 times for more than 10.000 people. It is a workshop theater that allows different performances for the characters chosen to the play. Merlin, Morgana, King Arthur, Student and Alchemist are the principal ones, but sometimes a Pink Fairy, a Princess or a Teacher appears to complete the cast. The main characteristic of this play is the possibility of different actors play as different characters, once is a performance workshop, not to mention the fact that chemistry experiments and concepts could be learned by students of different areas.

Introduction

The science theater is a powerful way to publicize the science to general public and alphabetize scientifically all the participants of the project. Playwrights, including Michael Frayn's Copenhagen and Tom Stoppard's Arcadia, are examples of theater performances which subject is science. The collaborative theater is a recent movement, and scientists and artists are involved in the writing and development of these plays.

Weitkamp and Dowell (2011) described some collaborative process of making theater inspired by science, named Sci-Arts. However, the process are well known, the relationship and motivations among scientist and artists to produce these plays are not. The authors describe some aspects of Kirby (2003a, 2003b) and LaFollette (2008) studies about the potential of scientists in co-creating cultural productions. Usually, relates the science to social context is a challenge to scientists that are inside the box and makes easier the ideas access and practice a social critique by the public in general. (BEN-DAVID, 1974)

The Ouroboros Science Theater group joins science and art in a collaborative process involving scientists, artists and also undergraduate students which participate of the whole process since the writing script until the presentation. The appropriate language to practice the science communication (PIMENTA, 2006; REIS, 1954; MASSARANI, 2002) is always the main part of the script construction joined to an interesting issue, such as Alchemy, Astronomy, Environment, Earth and others, and sometimes visual effects promoted by chemical reactions.

Objective

The main goal of the project is communicating the science by the theater, promoting the scientific literacy to the general public. The language and the context is always adapted to the children, teenagers or adults that participate of the presentations.

Methodology

The theater play construction presents some steps that usually are completed in 6 months of intense work.

- 1- The cast are selected among university students
- 2- The collaborative playwriting is created
- 3- The staging starts and adaptations are applied
- 4- The theater design and scenery are built
- 5- Chemical reactions are tested
- 6- Final staging with lights, special effects of soundtrack and chemical reactions
- 7- Presentation
- 8- Dialog with the public after the presentation.

Results and Discussion

The playwriting Magic X Science was chosen to be presented at this conference and analyzed by these purposes. The play shows some aspects of an university student life preparing a homework of Chemistry in an unusual way: dreaming. The character is helped by someone on the audience which dialogue with her during the play.

Some different points are figure out in the playwriting:

Lack of motivation

*Student: Oh... I'm very tired today, I thought that the worst part was enter in the university, but the worst part in fact will be finish this!...
....What? Encyclopedia? Do you mean wikipedia? No? We need to look for at this book not in internet, I see...and I didn't like. ...Ok. Let me see this encyclopedia...Have you ever used this? It's very old! A lot of acarus...*

This lack of motivation is very common nowadays among the students, that don't know, sometimes, why or what to do when they enter in the university. It was presented the internet sources in day by day life, and the low usage of books like encyclopedias to do researches.

History of Chemistry

The interesting issue chosen was Alchemy and the legend of king Arthur. A duel between an Alchemist and Merlin was thought, just to show some characteristics of magic and science, even if these characters were of different times.

Student's homeworkOn the other side of the kingdom, was living an alchemist who wanted to change everything into gold, discover the philosopher's stone and the elixir of eternal life. ...Alchemy differs significantly from modern science in its inclusion of Hermetic principles and practices related to mythology, magic, religion, and spirituality. It is recognized as a protoscience that contributed to the development of modern chemistry and medicine. Alchemists developed a structure of basic laboratory techniques, theory, terminology, and experimental method, some of which are still in use today.

Now, we have some comparing of magic and science

Student speech: So, the scientist looked for the reason that substance cures, while the wizards just search for what plant is believed magical. Once the teacher said that her grandma gave her a chamomile tea to calm down, but she didn't know the real motive that worked. So, the popular beliefs just know that plant calms down, but the chemists look for the molecule that acts in the nervous system, relaxing the body.

Merlin: ...However I haven't come here vainly, I need to look for something very important.

Alchemist: Oh, searching what? You don't even know how to use these herbs, neither their actions in the organism... Go back to your cave and play with your magic things....

...Alchemist: No way! Have you never heard about the elixir of eternal life, which cure all the diseases?

Merlin: I've heard about it, is not the one that all the alchemists try to prepare, but no one has succeed?...

Some chemistry experiments were performed to attract the public attention and explain some reactions

Alchemist: I need to test the color of the elements on the fire. When we burn the substances, it presents different colors. I have lithium. The symbol is L – i. Do you know what is the lithium color when it burns?

Alchemist: Amaryellow, Red, Black, Purple, Gold, Green, Blue... ok ok.

Let's test. Oh... Carmine!



Figure 1: Flame test in Ouroboros Science Theater

And finally, some chemistry concepts and motivation are presented to conclude the story.

Student: ...What a stink! It is red cabbage juice not unicorn blood...and of course it changed its color, it is an indicator. When we put this with acids becomes red and with bases becomes green. And this one? Ah, hydrogen peroxide and potassium permanganate! Oxidation reactions that are very exothermic and you can see condensed water vapor here. Cool!



Figure 2: Oxidation reaction in the Ouroboros Science Theater

Considerations

This script was created based on a research about science theater performances, chemistry concepts and visual experiments. It can be adapted by anyone to present and watch. The goals of publicize the science and practice scientific literacy are reached once the dialog between the audience and the cast is always very interesting and profitable.

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