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Training Students and Teachers in Theatre and Science: An Interdisciplinary Drama-Based Research for Science

Clio Fanouraki

Nik. Kazantzakis 79, Athens 15772, Greece

Corresponding Author: Clio Fanouraki

Abstract

The present study focuses on theatre/drama-based design for the implementation of educational seminars in the field of coupling theatre and science, and more specifically on the interdisciplinary and intercultural dialogue on genetic and cultural heritage, based on a true story of a genetic mutation that affects the life of a teenager and the community. The aim of the interdisciplinary educational programme is to familiarise students with the concepts of diversity, self-activity and respect for others, through experiential learning [science & language] and theatre education processes. A drama-based story about “Johnny with the tail”, implemented in Greek teams of students from 2019-2020, 2022-2023 introduces them to the true story of an Indian

teenager with a tail, genetic mutations, and religious and sociological implications in East or West. Drama-based results, as experienced and perceived by teenagers, educators and drama teachers in Greece, focus on the creative production of oral and written speech through improvisation, escalating documentation and argumentation, and interdisciplinary effective learning in different areas of the curriculum (Modern Greek Language, Myths and Culture, Biology, Rituals and Religions etc.). Due to the experiential nature and targeting of the action, for the research monitoring of the design and implementation, mixed methods of self-ethnographic study with the use of participatory observation and art-based research were used.

Keywords: Interdisciplinarity, Multicultural Drama, Point of View in Drama, Drama Based Biology, Drama Across the Curriculum, Genetic Mutations, Science and Religion

1. Introduction

Theatre and drama as a way of teaching science has emerged as a subfield of theatre/drama education for the teaching of curriculum subjects and has been a creative way of approaching science. Drama or drama activities suggested as curriculum pedagogy for a variety of subject areas or as an independent subject (Miller&Saxton, 2004, p. 1),^[1] has led to the emergence of individual theatre pedagogical forms or activities for science courses, while at the same time presenting common points of application for the humanities disciplines (language, literature, arts etc.). At the same time, Eisner (2017)^[2] developed the strong view that students are creative meaning-makers primarily through the arts, and Einsteins’ quote "Imagination is more important than knowledge" (Siegel, 2023)^[3] gives the impetus to more theatre/drama teachers and researchers to build new ways of letting students’ imagination run wild and give an even greater boost to their knowledge and science. STEAM education [Science, Technology, Engineering, Arts, Mathematics] and STEAM training (Quigley& Herro, 2019)^[4] has made theatre/drama attractive but also more familiar and known to teachers who were not familiar with theatre art before contact with STEAM, factor that makes arts in education more attractive.

In this context of using drama as a learning integrator for science, in this paper it would be presented interdisciplinary research that has been implemented from 2019 to date based on a theatre pedagogy program for high school students (Lyceum 15-18 years old) which connects the art of theatre, genetic mutations and adolescents’ perceptions of religion, society, science and traditions.

2. Materials and Methods

2.1 Materials

The theatre program “Dramatising Miracles: Diversity, Self-Action, Anti-Racism”, uses as basic materials the web-based articles on the topic of human tail mutation (Thermopoulos, 2020, Rosenbaum, 2014, Gretchen Vogel, 2021)^[5, 6, 7] and renews

internet resources, all of which are given to participants in printed form as a single training material. Key implementation tools are also the theatrical animation, the introduction of the teacher into a role, by using a clothing item (a long jacket or a large blouse) that the animator uses to hide part of his/her body, glue and markers for the notes of the students and teachers taking part in the action. A space is required in which participants can work in a circle in the plenary session and have room to move freely in small groups.

2.2 Methods

The main objectives of the project led to the choice of methodology which was based on the teacher in role and the dramatization of texts based on genetic mutations and social influences on adolescent life in the East and West:

- To increase the awareness on genetics mutations in education themes and options
- To identify common and differentiating elements between genetic and cultural heritage among students and citizens of different cultures and their impact on the perception of science and technology issues-through drama and alternative perspectives
- To understand the main concepts related with drama/theatre and how they can be useful for people and pupils with a congenital disability or acquired diversity
- To acquire new learning motivation through experiential and artistic activities
- To motivate the trainees to be engaged with the following stages of the project

According to these objectives, theatre/drama teachers and pedagogues trained to learn how to implement the program designed by the writer, implemented in phases. The main participants were pupils aged 15-18, lived in Athens and different parts of Greece as trainees and the professionals-trainers who were trained as drama teachers/facilitators. Trainers would be able to identify the scientific issues in drama education subjects and the main areas where their didactic techniques can be reinforced during interdisciplinary drama-based programs. Trainers would be also able to find alternative perspectives on their interests and new ways of gaining different types of theatre/drama education across the curriculum. Trainees would be able to discuss, analyze and find solutions to interdisciplinary themes through drama processes.

Subsequently from the above, drama activities and Biology Based Stories were applied to the group of teachers so that they could apply them to different group of students in a two-hour activity.

The experiential training session for theatre/drama teachers lasted 30 hours, face-to-face and on line and involved exemplary application/teaching to students, followed by a discussion for feedback. The application to students took place over two hours, in a total of over 25 applications.

The drama teachers were free to study further, through individual study, in the field of genetic mutations and social implications in East and West, beyond the given material, as presented in the materials.

At all stages of the implementation of the project, the writer and designer of the action, emphasized the art-based and qualitative evaluation of the action. For this reason, the following were utilized: participant observation, by each drama teacher/facilitator who implemented the project, by

the writer, as well as focused questions in group forums with the drama teachers after the implementation in the groups. Finally, in the final feedback the students and educators express their views on the activity and the animators implementing the project collect the evaluation in evaluation sheets and personal diaries. The personal diary was particularly helpful to all those trained by the writer to implement the project and all those who implemented it, both for the 'in-role' and 'out-of-role' elements of communication with pupils. Feedback in the notes helped for details of implementation and for recording the attitudes and views of pupils and teachers who attended.

2.2.1 The Intervention Flow

In drama we are exploring people's attitudes and points of view, and so anyone can play any role, we take on roles against type and against gender all the time (Miller & Saxton, 2004, p. 4) ^[8]. In the present story, the main teacher/facilitator takes a role who wears a wide sports jacket or a big long cardigan to hide his/hers buttocks and sits in a strange way at an angle on the chair, as if s/he is hiding something on him.

During the first part of the monologue, *teacher in role* (Baldwin, 2019, Ackroyd 2004) ^[9, 10] presents the problem of the person s/he is impersonating, about which the students still do not know any information. So they hear and see from the physical expression that shows a difficulty in sitting, does not seem to accept something on his/her body, they see that she moves with a difficulty rather than ease [problem exposure].

At this stage the narration stops, the teacher comes out of the role and asks the students which person they think is the one they met and what is happening to him. At this point, the response of the teenagers is of particular interest, who answer that it is a teenager who is dealing with external appearance issues because he/she has more weight, it is a person with a disability who is not accepted by those around him, it is a person who he wants to hide something different about himself and he doesn't know how, this is a person who hides issues of gender identity, and other similar responses that capture adolescent concerns and sensitivities [interaction part].

In the next stage the facilitator comes back into role and reveals to them that he is a person with a tail, he dialogues with them while making sure to talk about his problem himself and at the end of the monologue he reveals to them that the story of a teenager in India helped him/her to see his problem from another point of view and invites them to discover the story of the Indian Teenager. [emphasizing the fact that he comes from a country of western civilization].

At this point participants study the literature (internet/journalistic type & texts about genetic mutations/introductory texts) and prepare themselves to take part in the action, gathering arguments to enter into roles through which they investigate the story of the Indian teenager with the tail [investigating the story/problem]. Here are some indicative phrases from the given texts: "An Indian teenager is being worshiped like a god because he has a tail. Arshid Ali Khan, 13, is referred to as Balaji, an incarnation of the Hindu monkey god Hanuman, because of a 7-inch "tail" protruding from the middle of his back. Locals in his Pujab state consider him a divine symbol, and visitors come to be blessed by him daily. His worshippers often leave gifts, and sometimes even money, to pay their respects to his godly

deformity. "I love my tail," Balaji told nairaland.com. "It's a gift from God. It's unusual, but people respect me and bow before me because of it. I feel special." "Balaji is just one of 40 people who were born with a "human tail," according to People's Journal of Scientific Research. But soon, he may have to get his beloved snake-like growth removed because it is causing health problems". (Rosenbaum, 2014)^[11].

After studying other articles on genetic mutations, in groups, the students get into a role:

- scientists who support genetic mutation
- friends of the Indian teenager
- family members
- community members/religious people who believe they are incarnations of god/ believers/ loyal followers
- -journalists

Based on the roles of each group, they discuss, exchange views and substantiate arguments and positions on whether or not to cut the tail and their positions on the issue. According to their positions, each group organize with improvisation and dramatization to present their position through 1-2 scenes in which the Indian teenager with the tail is also involved. [inquiry-based solutions].

The interest in these presentations is the rapid escalation of argumentation within the social and cognitive context of each group and the increase of arguments and empathy. The groups present the results of the improvisation to the plenary and then we invite a student or teacher to play the role of the teenager and we ask him questions about his choices, while then other persons from the family also enter the question-chair process (Fleming & Stevens, 2004, p. 137)^[12].

Discussion and feedback follows where interest is undiminished in interdisciplinary fields of identifying and addressing genetic mutations in different communities as well as addressing disability or a mutation from culture to culture.

Then the group coordinator (theatre/drama teacher) re-enters the first role of the person with the tail, from Western culture, and thanks them for their participation in this cross-cultural journey and expresses gratitude for how much they helped him to face his own problem, while at the same time saying goodbye saying "I may be some person you have actually met or read about in literature, seen in the cinema or encountered in your dreams or fears" letting the boundaries of the real and the imaginary enhance the creative results of the above experiential process. After revealing his name, they call him John, before saying goodbye, he asks them to tell him something they would like. The teacher steps out of the role and invites the participants to the final stage of creative feedback. There is also a creative section where we ask students what the tail symbolizes for them in their lives and which feeds thoughts on developing new stories of their own which they can work on as an extension of the specific program later (in class or individually).

3. Results

From my overall participation in the design of the program, in the training of the facilitators who implement it and in its implementation in groups of visiting students, I am allowed to conclude through participatory observation, discussion and feedback of the drama teachers (interviews, focus groups discussion) and based on their personal diaries and evaluation sheets (open-ended) that they filled in, that it is noted: that students are rapidly becoming aware of intercultural and religious identities, genetic mutations and

scientific achievements, intercultural traditions and adolescent trends, fears and hopes on the world wide web.

The teachers who accompany the students and have chosen to attend the program - in the daily feedback discussion - point out the intersubjectivity, the increase in argumentation in fields that have not been analyzed or further taught in the field of literature, biology, language and history. While at the same time they point out the fluency of production of oral speech and theatrical language and expression by teenagers who do not participate so much in the traditional course.

Drama Teachers who implement the project, note the increased argumentation in the individual topics of each group in terms of genetic mutations, religious views and adolescent trends, the cultivation of oral language and the use of embodied language and embodied learning, through the art of theatre.

One of the key facilitators (H.K.) who implemented the program more than 15 times in different groups of 30-50 students observes that: a. the students had negative stereotypes about what genetic mutations are, they considered it something "charged", not all of them had the knowledge and awareness about genetic mutations, b. the students show great interest in realizing that all the improvisations they made are based on the true story of a teenager and that the evidence (documents) they relied on are real, c. most students focused on the question of whether to cut the tail or not and were concerned with documenting, through the role of his group, this choice, d. most groups equated religion with something sacred, e. most groups led to the clash of biologists, scientists and theologians or religious people about their beliefs about genetic mutations, while many groups asked if they could include the role of scientists in their own stories to show the different perspectives, f. in most improvisations a family member grows up blindfolded and comes into conflict with science and studies dealing with genetic mutations in the course of human evolution, g. the students' messages to Johnny at the end of the act capture how the students strengthen mental resilience, advise him to always be himself, h. the facilitator notes the high interest participation of all students and the interdisciplinary mastery of argumentation and interest in the topic, which then motivates them to study all the cognitive areas that have emerged: science, religion, society.

4. Discussion

By bringing theatre and science into an artistic and scientific dialogue, new interest in either theatre or science, or increased interest in one of them, is provoked in an attractive way. It is observed that the present educational program, through the art of theatre, achieves experientially to familiarize teachers and students with the concepts of diversity, respect for different views (social, intercultural, ethical, developmental, etc.), based on attitudes towards genetic mutations, through experiential learning, dramatic activities and theatrical methods. In discovering who young Johnny is, participants engage in free and semi-guided improvisations in which they explore the concept of the perception of diversity in multiple cultural, historical, religious, genetic/biological and socio-political contexts. The specific objectives of the program are realized and relate to the creative production of oral discourse (scientific, artistic, journalistic and artistic discourse in role), as well as the production of original improvisation scripts which

students have primarily structured in their notebooks (cultivating computational thinking and intercultural skills). At the same time, the multiple possibilities of interdisciplinary development and cultivation of subjects from literature, biology, religion, sociology and culture are observed from the feedback of the teachers who participate together with their students. For this reason, in the context of embedded learning, the present activity can be a fertile ground before the specific teaching of subject areas related to genetic mutations, seen through the different sciences and arts. Additional thematic axes that emerged through the students' recruitment of the given circumstances (through improvisations in roles, their in- and out-of-role views, their final oral feedback) are the philosophical dimensions, references to mythology and associations stories of mythology and religion, love for fellow human beings and animals, as well as for deviant forms from accepted standards of appearance and existence.

5. Conclusions

It seems that the contribution of a special teacher, from the field of theatre education, contributes very creatively and effectively to the vertical and horizontal connection of knowledge objects through the holistic approach of theatre pedagogy. Of course, the individual scientific fields are then studied by the teachers of specialties, sciences or humanities, depending on how and how much the teacher wants to make use of the current experience at school.

In another possible case of application, when teachers are given the possibility to cooperate in advance, the program can be implemented as a stage of knowledge assimilation, in the case that the students have already been taught the relevant units, so they proceed through the improvisations to assimilate the existing knowledge. In any ways, whether as an occasion for familiarity with genetic mutations or as a reinforcement, our dramatized story also functions metacognitively for the entire participating educational community.

The inter-artistic and interdisciplinary dimensions fostered by a dramatized story and our central facilitator in the role of a teenager with a tail, captures the transformative dynamics of theatre in education and its multiple practical connections with contemporary trends in pedagogy, experiential learning and fruitful connecting school and community, with all the theoretical and sociological ramifications.

I hope Johnny's story with the tail will spark more teenage stories and readings to be heard.

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