

# WHAT IF...? DRAMA AS A TOOL FOR SOCIO SCIENTIFIC INQUIRY

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*Modern societies are characterized by a controversial interface between science and technology. At this interface Socio-Scientific Issues arise, encompassing socio-political values and techno-scientific challenges which are complex and involve diverse perspectives. This paper addresses in what way drama allows to explore socio-scientific issues in science education. We connect to the educational framework, socio-scientific inquiry based learning (SSIBL). The rationale for SSIBL is participation through inquiry in addressing authentic questions on socio-scientific issues. We argue that dramatization allows students to enact possible solutions to such questions and illustrate dilemmas. Despite the relatively large body of literature, drama in science education remains unexplored and underused due to difficulties in crossing borders between the pedagogy of science and the pedagogy of drama. To bridge this divide we stress the congruence between science and drama and arrange socio scientific inquiry as drama experiments. The techniques for staging and expressing emotions and ideas are equivalent elements compared to the components of scientific inquiry. Possible 'what-if scenarios' can be staged and tested in an experimental fashion thereby naturally crossing the pedagogical borders between science and drama. We draw on experiences from a case study in which students collaboratively scripted a moral/ethical role-play on science in society and performed and witnessed it in classroom. This approach constituted a collaborative student-centered process, allowing the teacher to stimulate reflection on the imagined dilemmas. Further research on such drama-experiments could provide a more complex understanding of how they further the empathetic imagination of science students.*

*Keywords:* drama, socio scientific issues, inquiry based learning

## INTRODUCTION: SOCIO-SCIENTIFIC INQUIRY BASED LEARNING

Personalised medicine, biofuels and chip implants are emerging technologies that enhance our health, environment or performance now or in the near future. They alter our everyday lives and bring scientific uncertainties and social risks with them to be considered by all members of society. Preparing pupils to deal with so-called Socio-Scientific Issues (SSI's) while still attending to the more factual and scientific aspects is a crucial aspect of science curricula in the context of the European initiative Responsible Research and Innovation. Within this context Socio-Scientific Inquiry Based Learning (SSIBL) has been developed as a pedagogy which integrates inquiry based science education, SSI's and citizenship education (Levinson, & The PARRISE Consortium, 2016). The SSIBL approach is characterized by participation of learners through inquiry in controversial issues arising from the impacts of science and technology in society. It is based on three main characteristics:

- creating opportunities to investigate authentic questions related to SSI's;
- solutions to such questions must involve actions, and
- involve inquiry-based learning to understand the links between science and society

SSIBL aims to consider perspectives personally, socially (e.g. including friends and the community) and globally (including broader socio-economic and political perspectives).

### Drama in Science education

Dramatization allows students to illustrate dilemmas and enact possible solutions to questions related to SSI's. Drama, and more specifically role-play, may engage students in learning activities with a high degree of interaction, allowing them to actively co-construct meaning together with their teachers and peers (Wilson & Spink, 2005). It fosters the acquisition of cognitive, procedural and affective knowledge in an

integrated way (Ødegaard 2003; Dorion 2009). This highlights the potential of drama for effective learning about moral and ethical dimensions of science (McSharry & Jones, 2000). Despite the relatively large body of literature, drama in science education remains unexplored and underused due to a lack of understanding how drama can be put to use in ‘rational’ science education (Braund, 2015). Difficulties have been described as problems in crossing borders from the pedagogy of drama to the pedagogy of science and vice versa (Fels & Mayer, 1997; Braund, 2015).

## **SCIENCE AND DRAMA: CONGRUENT PRACTICES**

To bridge the divide between the pedagogy of science and the pedagogy of drama we stress the congruence between science and drama. Drama may function as a laboratory in which the various techniques for staging and expressing emotions and ideas are equivalent elements compared to the scientific components (Kottler, 1994, p. 273). Pupils and teachers used to the rational context of experiments and investigations in science classes, could be encouraged to ‘export’ the experimental design to a real-life situation. By probing and enacting possible scenarios in a relatively safe environment, they are invited to deepen their understanding of the social dimensions of science. As others have argued, drama enables the exploration of different perspectives and conflicts in SSI’s, including students’ own relationships with the conflict (Colucci-Gray, et al., 2006). However, using drama in science education faces the challenge of teachers perceiving a loss of control when their students are improvising in an experiential setting. Therefore, McSharry and Jones (2000) suggest to use more structured forms of drama, for example by scripting classroom performance in advance.

### **A 3-step module of scripted drama**

Based on the above we suggest a 3-step module of scripted drama: 1) collaborative writing of a script, 2) performing it before an audience of peers, and 3) watching and assessing the performances of others. Such an approach features students’ performance as a kind of experiment, starting from an initial situation (the ‘control condition’) in which a novelty or unexpected element is introduced (the experimental condition), which then unleashes a series of consequences, building up the dramatic plot (outcome). With the emphasis on acting and reflecting on science with and for society, drama can be used to explore ‘what-if’ scenarios as a means of socio-scientific inquiry.

This approach has been tested in a previous case study in which students (n=22) were asked to explore future societal impacts of emerging neuro-technologies in a short play of 8 minutes (Toonders et al., 2016). The drama experiment showed that placing oneself in a real life situation, for example by enactment in a play, stimulated students to link scientific knowledge with personal assessments and views on societal issues (Toonders et al., 2016). The plays, scripted and performed by students, built on the experimental metaphor introduced above as students decided to enact both a neuro-enhanced and a ‘control’ condition. While students as script writers and actors actively used their imagination, as audience they represented the ‘reality principle’, assessing and discussing the plausibility and credibility of the enacted scenes (O’Neill, 1985). This illustrates pedagogical border crossing between science, i.e., learning about neuro-enhancement, and drama, i.e., learning to perform an ethical quandary.

## **CONCLUSION**

Connecting to the field of drama in education we drew on experiences from a case study in which students collaboratively scripted a moral/ethical role-play on science in society and performed and witnessed it in classroom. Such drama-experiments allow possible ‘what if... scenarios’ to be staged and tested thereby naturally crossing the pedagogical borders between science and drama. Further research on such drama-

experiments could provide a more complex understanding of how they further the empathetic imagination of science students.

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