Exploring the implication of science communication practices on a model for teacher professional development:

Serving up the Pierian Waters

Pettikirige Sean Francis Perera

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Centre for the Public Awareness of Science
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Declaration

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text. The empirical work within was not carried out with any other person.

Sean Perera
The journey towards this final product has not been a solitary one. It has been made possible by the support and generosity of many, a few of whom I mention here.

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Abstract

Science communication, over the last two decades, has shifted its onus from public understanding to public engagement. These efforts have been paralleled in science education, which strives to promote continued student engagement with science. Persistence with more traditional forms of pedagogy by teachers in middle school is a chief deterrent to this endeavour. Since many teachers’ inadequate understanding about science is regarded as inhibiting their use of inquiry-based pedagogy, professional development based on constructivist principles has been identified to remedy this problem. This study investigates the constructivist basis for a model of short-term professional development, which has not been addressed in the literature. The one-day workshops offered to middle school science teachers in Australia and overseas by the Centre for the Public Awareness of Science (ANU, Canberra) are investigated here. While the workshops did facilitate conceptual change in the teachers, it was found that the constructivist principles which were incorporated into the workshops’ design and delivery were underpinned by science communication practices. The conclusions presented include: the possibility of a constructivist framework for short-term professional development; the need for greater involvement of science communication in science education reform; and the unique challenges which confront science teachers from non-Western cultures.
# Table of contents

**Introduction**  ................................................................. 1

Chapter 1: Introduction  ............................................. 2

**Background**  ................................................................. 15

Chapter 2: Communicating science  .................................. 16
Chapter 3: Science in middle school  ..................... 40
Chapter 4: Science teacher education  ..................... 100

**Research methods**  .......................................................... 150

Chapter 5: Research methods  ..................................... 151

**Results and discussion**  .................................................. 182

Chapter 6: Observations  .............................................. 183
Chapter 7: Interviews  .................................................... 244

**Conclusions**  ................................................................. 311

Chapter 8: Conclusions  ............................................... 312

**References**  ................................................................. 330

**Appendices**  ................................................................. 357
List of tables

Table 1: Purposes of science in the compulsory years 43
Table 2: Teacher perceptions of student attitudes to science 46
Table 3: Teaching for scientific literacy 57
Table 4: Perceived relevance of science in the secondary school 74
Table 5: Factors limiting the quality of secondary science teaching 109
Table 6: Disciplinary backgrounds of the middle school science teachers 122
Table 7: Flanders interaction analysis system 166
Table 8: List of observational variables 167
Table 9: Questions used in the interviews with teachers 173
Table 10: A typical one-day CPAS workshop program 184
Table 11: A sample set of activities in a typical one-day CPAS workshop 186
Table 12: Numbers of teacher-participants in CPAS workshops in Australia 187
Table 13: Frequencies of Category 1 communications 189
Table 14: Frequencies of Category 2 communications 192
Table 15: Frequencies of Category 3 communications 200
Table 16: Frequencies of Category 4 communications 207
Table 17: Frequencies of Category 5 communications 221
Table 18: Frequencies of Category 6 communications 222
Table 19: Frequencies of communications in each category 320
Table 20: Three Stages of constructivist learning as exemplified by the CPAS workshop model 321
Table 21: Science communication practices as exemplified in the CPAS workshop model 324
List of figures

Figure 1: Representation of the mountain-climbing analogy 28
Figure 2: A model for the Personal Awareness of Science and Technology 30
Figure 3: Grid illustrating the role of communication in constructivist classrooms 34
Figure 4: Model for science and technology as components of culture 36
Figure 5: Flowchart outlining the underlying argument of the present study 153
Figure 6: Webpage advertising CPAS workshops 154
Figure 7: Different perspectives of the overarching research question as viewed by the three supplementary research questions 160
Figure 8: Flowchart showing the topics and role of key informant interviews 163
Figure 9: Flowchart showing the development and role of observational data 168
Figure 10: Flowchart showing the structure and role of interviews with workshop participants 174
Figure 11: Research procedures informing overarching research question 179
Figure 12: A quiz used in some of the CPAS workshops 194
Figure 13: Diagram showing the experiment with a burning candle 197
Figure 14: Photograph showing a roadside safety marker 203
Figure 15: Photograph showing the *Guesstimation* minds-on activity 211
Figure 16: Photograph showing the hands-on activity titled *Film can rocket* 213
Figure 17: Photograph showing the hands-on activity titled *Making a cloud* 214
Figure 18: Photograph showing teachers experimenting with *Parallax* 217
Figure 19: Photograph showing a *Clucking cup* 225
Figure 20: A diagram which apparently shows that pressure increases with depth 233
Figure 21: Photograph showing a charged balloon used to move a ping pong ball 250
Figure 22: Photograph showing the action of detergent on milk 267
Figure 23: The TSE explanatory framework for public physics lectures 280

Figure 24: Pie chart showing the average percentage of the frequencies of the six categories of CPAS workshop communications 321

Figure 25: A map for short-term professional development 322
I wondered through a mire:
The literature; deep and waywardly,
To find an un-hewn precious stone,
One that I could polish and make my own.
Since then I’ve spent years,
Sometimes laughing, through often in tears.
With a shining beacon at my side to be my guide,
I laboured to make that stone shine:
Refining my questions
And shaping my arguments.
Along the way a shard may have been cast aside,
Which may one day be another’s.
And now before you I lay my labours:
My thesis, a diamond in my eye.
(The author)
Prologue

Drink deep, or taste not the Pierian spring:

There shallow draughts intoxicate the brain,

And drinking largely sobers us again.

Fir'd at first sight with what the Muse imparts,

In fearless youth we tempt the heights of Arts,

While from the bounded level of our mind

Short views we take, nor see the lengths behind;

But more advanc'd, behold with strange surprise

New distant scenes of endless science rise!

(Alexander Pope, Essay on Criticism)

The Waters of Pieria have long been the fabled seat of the Muses of mythical Greece. In the extract above, Pope refers to the Pierian Spring as a source of inspiration and deep understanding. The short-title of this thesis draws on that meaning. The following pages describe a study which has explored how science communication can participate to develop deeper understandings about science, and thereby inspire more effective science teaching. The model of teacher professional development described here, acts as a metaphorical pitcher with which science communication serves up the Pierian Waters.