PrimaryConnections®
Linking science with literacy

Stage 3
Interim research and evaluation report 8

Professional Learning Facilitators workshop: January 2007

A research report for the Australian Academy of Science

Mark W Hackling
Edith Cowan University

Research Consultant to the *Primary Connections* Project

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The views expressed in this report do not necessarily represent the views of the Australian Academy of Science nor the views of the Australian Government Department of Education, Science and Training. The author accepts responsibility for the views expressed and all errors and omissions in this report.

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Introduction and Background to the Study

Introduction

Primary Connections is an initiative of the Australian Academy of Science funded by the Australian Government through the Department of Education, Science and Training. All Australian states and territories, government, Catholic and independent school sectors, and science and literacy professional associations were represented on a project reference group that provided direction for the conceptualisation and implementation of the project.

Primary Connections aims to improve science and literacies of science learning outcomes through providing an innovative program of professional learning supported with high quality curriculum resources based on a sophisticated teaching and learning model.

The *Primary Connections* project has been implemented in three stages. Stage 1, funded by the Australian Academy of Science sought and gained the support and involvement of all jurisdictions and sectors, and conceptualised the project. Stage 2 funded by DEST involved developing nine curriculum units and a professional learning program and trialing the program in 56 schools throughout Australia. The Stage 2 trial demonstrated positive impacts on teachers, students and schools (Hackling & Prain, 2005). Encouraged by these findings, DEST funded Stage 3 of the project to complete the task of developing curriculum units, training additional professional learning facilitators to provide professional learning workshops in schools throughout Australia, and to conduct workshops for university science educators to support them introduce *Primary Connections* into pre-service teacher education programs. *Primary Connections* is unique in that it involves providing professional learning to both pre- and in-service teachers in an attempt to reform teaching in Australian primary schools.

Professional learning

Professional learning for in-service teachers of science in primary schools is supported with *Primary Connections* curriculum resources and workshops facilitated by trained professional learning facilitators. Professional learning facilitators (PLFs) receive an initial three days of professional learning linked to a set of professional learning resource modules, and follow-up one-day workshops. A first cohort of PLFs attended a three-day workshop in Canberra during January 2006 and two, one-day follow-up workshops in Terms 1 and 3 of 2006. Research conducted with 2006 PLFs at the January workshop (Hackling, 2006a) revealed that:

- The 89 PLFs who attended the January workshop were representative of all jurisdictions, sectors and metropolitan, regional and rural areas of Australia.
- A majority were based in schools including teachers new to PC, PC trial teachers, science co-ordinators, deputy principals and principals, other participants included general education, science and literacy advisors. A large majority (84%) had a primary background.
- Only 5% of participants had no experience of professional learning facilitation and one-fifth had experience of primary science facilitation. School-based PLFs had less facilitation experience than other PLFs.
- When asked about the extent to which the workshop outcomes had been achieved, no less than 73% of participants rated all the outcomes in the two highest response categories. The least positive response was for the outcome related to skills and confidence of facilitation and this lower response was due to the low confidence of the school-based participants who had less experience of facilitation.
- Two-thirds of respondents indicated that they were very well or well prepared for their facilitation role, however, teachers in schools new to *Primary Connections* expressed a need for further support for taking on this role.

- Self-efficacy beliefs about effectiveness as a professional learning facilitator increased as a result of the workshop. School-based PLFs had lower self-efficacies than other PLFs. At the end of the workshop no participants had low self-efficacy and two-thirds had very high self-efficacy.
- School-based PLFs were less confident at the beginning of the workshop compared to other facilitators and their overall confidence as measured by the mean total confidence scale score increased les than for other facilitators.

Research conducted at the end of term 1 (Hackling, 2006b) and term 3 workshops (Hackling, 2006c) revealed that:

- The number attending workshops and completing questionnaires declined from 85 in January, to 72 at the end of term 1 to 60 at the end of term 3.
- Self-efficacy scores increased from end term 1 to end term 3 and were very positive. The mean total scale score for teacher PLFs was lower than for other PLFs.
- Of the PLFs that completed self-efficacy scales on all questionnaires, the number of PLFs with modest self-efficacy scores (<31) has been reduced from 19/40 at the commencement of their training to 5/40 at the end of term 3.
- Mean total confidence scale scores increased from the end of term 1 to the end of term 3. Mean item scores were all very positive (>4.3). Non-teacher PLFs had higher confidence than teacher PLFs.
- The most common professional learning activities conducted in term 1 were sharing resources and experiences, answering questions about the program and gaining the support of the principal.
- The PLFs presented 28 workshops in Term 1 and they planned to present 46 more workshops during the year. Most workshops were the Introduction to *Primary Connections* workshop.
- Most PLFs modified the professional learning resources to suit the local context. Suggestions for modifying the professional learning resources included breaking the one-day Introduction to *Primary Connections* workshop into smaller modules and adding more work samples.
- A total of 56 papers, workshops and information sessions were presented in Terms 2 and 3 by the 60 PLFs who completed this questionnaire. At the end of Term 3 two-thirds of the PLFs had presented workshops
- The main factors enabling PLFs' effectiveness include their position, communications network, support of line managers, time being available for facilitation work, high interest in *Primary Connections*, and having the knowledge and skills required for facilitating *Primary Connections* workshops. The main inhibitors appear to be time for facilitation work and conflicting priorities within schools for making time available for *Primary Connections* workshops.

Following a focus group meeting with a sample of active PLFs (Rostron, 2006), the design of the three-day January 2007 workshop for the next group of PLFs was developed addressing feedback from the focus group and incorporating a design modified from that used in January 2006. The plan for 2007 incorporated a larger workshop component and PLFs rotating through workshops in groups rather than all PLFs attending the workshops in the same sequence.

Method

Professional learning facilitators were recruited by the Academy of Science through high ranking officials in each jurisdiction and sector. A total of 118 participants were brought to Canberra for a three-day workshop in January 2007. Details of the participants' state and sector or origin is reported in the results section.

An outline of the professional learning workshop is attached at Appendix 1.

The intended outcomes for the workshop were to develop:

- Understanding of the *Primary Connections* project, teaching and learning model and curriculum resources
- Understanding of the *Primary Connections* professional learning model and resources
- Confidence and skills in facilitating *Primary Connections* professional learning workshops
- Ability to adapt the professional learning resources and practices to meet the needs of different audiences
- Network of colleagues as a *Primary Connections* facilitator

An extensive questionnaire was used to collect background and baseline data about the participants prior to the workshop. Questions included open response items, objective items and agreement scale items. At the end of the workshop participants completed a second questionnaire which collected data to evaluate the impact of the workshop and data that could be used to improve future workshops and the professional learning resources. The two questionnaires are attached as Appendices 2 and 3.

Coding manuals were developed to guide the coding of data and its entry into spreadsheets that could be downloaded into SPSS for calculation of descriptive statistics. Responses to open-ended questions were categorised into categories and the frequency of responses in each category was recorded. Agreement scale items were coded from 5 to 1 i.e., from the most positive to the least positive response.

Results

The results of the study report data about the background of the facilitators, their beliefs, the impact of the workshop on their confidence and self-efficacy as facilitators, their views about uptake of the program and their roles and support needs, the extent to which workshop aims were achieved and feedback from the facilitators about the workshop and professional learning resources.

Demographic data

One hundred and eighteen participants attended the workshop; of these 112 completed the initial and end of workshop questionnaires. Data are reported for these 112 participants.

Jurisdiction, sector and geographic location of PLFs

The origin of the participants in the PLF workshop was analysed by jurisdiction, sector and geographic location and these data are reported in Tables 1-3.

Table 1: State of origin of facilitators (n=112)

State of origin	Number	Per cent
NSW	24	21
QLD	23	21
VIC	24	21
WA	18	16
SA	13	12
ACT	3	3
TAS	5	5
NT	2	2

Table 2: Origin of facilitators by sector (n=112)

Sector	Number	Per cent
Government	79	71
Catholic	22	20
Independent	6	5
Other	5	4

Table 3: Regional location of facilitators (n=112)

Location of facilitators	Number	Per cent
Metropolitan	50	45
Regional	39	35
Rural	20	18
No response	3	2

All jurisdictions, sectors and geographic regions were represented in the cohort of PLFs. The independent school sector was under-represented. The PLFs were recruited from a wide range of workplaces. Compared to the 2006 cohort, a much larger number of 2007 PLFs were central/district office personnel (Table 4) and 40% were based in schools (Table 5). The 2006 cohort comprised almost 60% school-based persons (Hackling, 2006a).

Workplace and professional roles

The workplace and professional roles of PLFs are reported in Tables 4 and 5.

Table 4: Workplace of facilitators (n=112)

Workplace	Number	Per cent
Central office	40	36
Primary school	38	34
District office	18	16
Science centre	6	5
Other	6	5
University	2	2
Professional association	2	2

Table 5: Professional role of facilitators (n=112)

Role in 2007	Number	Per cent
General education advisor	49	44
Class teacher	19	17
Science coordinator	11	10
Deputy	10	9
Literacy consultant	7	6
Principal	4	4
Science consultant	5	4
Project officer in science or professional association	4	4
Other	2	2
No response	1	1

Professional experience

The professional experiences of PLFs are reported in Tables 6-9. Most of the PLFs (77%) had been in their current role five years or less and 75% had significant experience in the primary phase of schooling. Fifty-five per cent of PLFs had more than 20 years of professional experience in education (Table 6). A large majority of PLFs (71%) had experience of teaching primary science while 17% had been a primary science consultant or project officer and only 4% had not taught science at either primary or secondary levels(Table 7).

Table 6: Years in employment in education sector (n=112)

Years of employment in education sector	Number of responses	Per cent of respondents with this response
5 or less	6	5
6 to 10	15	13
11 to 15	12	11
16 to 20	17	15
21 to 25	24	21
26 to 30	19	17
31 to 35	11	10
More than 35	8	7

Table 7: PLF workshop participants experience with teaching science (n=112)

Area of experience	Number of responses	Per cent of respondents with this response
None	4	4
Primary classroom	79	71
Secondary classroom	25	22
Primary science coordinator	9	8
Secondary science head	4	4
Primary Consultant/project officer	19	17
Sec. Consultant/project officer	3	3
Total number of responses	143	
No response	5	

The PLFs were also asked to rate their confidence with aspects of science teaching on a five-point scale. Mean ratings varied between 3.59/5 for explaining science concepts to 4.23/5 for engaging students' interest in science (Table 8). Standard deviations were relatively large indicating wide variation between PLFs in their ratings which is to be expected given that some are highly experienced teachers of science while others with a literacy background had little experience as a teacher of science.

Table 8: Mean ratings of confidence with aspects of science teaching (n=112)

Aspect of teaching	Mean rating	
	Mean	s.d.
1. Engaging students' interest in science	4.23	.735
2. Managing hands-on group activities in science	4.13	.900
3. Managing discussions and interpretation of science observations	3.88	.928
4. Explaining science concepts	3.59	.991
5. Teaching science processes	3.71	.980
6. Developing literacy skills needed for learning science	3.92	.840
7. Assessing children's learning in science	3.70	.890
8. Using computers and ICTs in science	3.45	.966
9. Using a constructivist model to plan science units of work	3.79	.882
Mean of individual means of confidence ratings (/5)	3.82	.673
Total scale score /45	34.4	

Note. Confidence was rated on a five-point scale
NC = No confidence = 1, LC= Limited confidence =2, OK = 3, C = confident= 4,
VC = Very confident = 5

Most of the PLFs had literacy teaching experience and 22% were literacy consultants or project officers (Table 8).

Table 9: PLF workshop participants experience with teaching literacy (n=112)

Area of experience	Number of responses	Per cent of respondents with this response
None	2	2
Primary classroom	76	68
Secondary classroom	14	13
Primary literacy coordinator	5	4
Prim. Consultant/project officer	17	15
Sec. Consultant/project officer	8	7
Number of responses	**122**	
No response	13	12

Almost 40% of the PLFs had taught with Primary Investigations while 5% were *Primary Connections* trial teachers and 4% had participated in the Spotlight on *Primary Connections* workshops conducted in Queensland (Table 9).

Table 10: Per cent of workshop participants with experience with *Primary Connections* and/or Primary Investigations and/or PC Spotlight workshop (n=112)

PC trial teacher in 2005	Taught with Primary Investigations	Participated in the Spotlight workshop 2006
5%	38%	4%

Experience as a facilitator of professional learning

Only five PLFs had no facilitation experience and the majority has experience of facilitating professional learning for primary teachers (Table 10). Non school-based PLFs had far more facilitation experience than other facilitators (Table 11).

Table 11: Experience in facilitating professional learning (n=112)

Area of facilitating experience	Numbers of people		
	Primary	Secondary	Both primary and secondary
No experience			5
Science	30	8	14
Literacy	34	1	12
Numeracy	17	1	8
General education	19	4	23
Multiple learning areas	5	0	5
Other prim	14	1	7
No response			3

Table 12: Experience in facilitating teacher professional learning by professional role (n=112)

Professional role	Numbers with facilitation experience			
	None	1 to 5 days	> 5 days	No response
Classroom teachers (includes science coordinators)	2	17	7	4
Others	2	23	55	2
All facilitators	4	40	62	6

Qualifications and academic studies

The PLFs qualifications and current studies are reported in Tables 13-14. Half of the PLFs had completed four-year BEd degrees and 40% had completed a bachelor degree with a diploma of education; 27% had completed a higher degree at master or doctoral level

(Table 12). Fourteen per cent were currently studying a higher degree. The cohort of PLFs were therefore well qualified, however, 53% has no more than Year 12 studies of science (Table 13).

Table 13: Post secondary qualifications (n=112)

Post-secondary qualifications	Number of responses	Per cent of respondents with this response
BEd	55	49
Diploma of education	45	40
Masters	29	26
Diploma of teaching	21	19
Other diploma	21	19
BSc	18	16
BA	13	12
Other certificate	10	9
B other	6	5
Diploma of primary teaching	3	3
Certificate of teaching	2	2
B Teaching	2	2
PhD	1	1
Number of responses	**226**	
No response	0	

Table 14: Highest level of science content/discipline studied (n=112)

Highest level of science study	Number of respondents	Per cent of respondents
Year 10	15	13
Year 12	45	40
1-3 undergraduate science units	12	11
Science Major	30	27
Postgraduate science	2	2
Not indicated	8	7

Beliefs about primary science and literacy teaching and teacher professional learning

Beliefs about primary science teaching

Teachers were asked about the purpose of primary science teaching, characteristics of high quality primary science teaching and the aspects most in need of improvement. These data are reported in Tables 15-17.

Table 15: Facilitators' responses to the question "What do you believe is the main purpose of teaching science in the primary years of schooling?" (n=112)

Main purpose	Number of responses	Per cent of respondents with this response
Affective	75	67
Cognitive	71	63
Scientific literacy	64	57
Total responses	210	

Three main purposes for primary science teaching were identified; these related to achieving affective and cognitive outcomes and scientific literacy. Characteristics of high quality primary science teaching mentioned by at least two-fifths of the PLFs included an inquiry oriented pedagogy, a good curriculum, a hands-on approach and high levels of teacher knowledge and skill. As with the 2006 cohort of PLFs, the 2007 cohort believed that the confidence and ability to teach primary science needed to be improved, and the status of science in the primary school curriculum (Table 17).

Table 16: Facilitators' responses to the question "What do you believe are the most important characteristics of high quality primary science teaching?"

Characteristic	Number of responses	Per cent of respondents with this response (n=112)
Pedagogy inquiry based	72	64
Curriculum good, relevant	50	45
Hands on, practical	43	39
Teacher knowledge and skill	44	39
Enthusiasm	21	19
Integrated	11	10
Good resources	10	9
Other	9	8
Total responses		

Table 17: Facilitators' responses to the question "What aspects of typical primary science teaching need to be improved?" (n=112)

Aspect of teaching to be improved	Number of responses	Per cent of respondents with this response
Confidence/knowledge/ability to teach/use resources	85	76
Importance/ranking	33	29
Quality teaching programs, not 1 offs.	29	26
Pedagogy inquiry based	24	21
Good classroom resources available	21	19
Integrated	8	7
Assessment, support for T's on this	7	6
Other	18	16
Number of responses	**225**	
No response	2	2.4

Beliefs about primary literacy teaching

The PLFs were also asked about the characteristics of high quality literacy teaching and what aspects of teaching literacy needed to be improved. These data are reported in Tables 18 and 19. The PLFs believed that good literacy teaching is relevant to the age, ability and learning styles of the children, occurs in context with explicit development of skills and addresses a variety of genres. Literacy teachers are expected to be knowledgeable and use assessment to inform planning. The two areas in need of

improvement mentioned most frequently were teaching in context and teacher professional development (Table 19).

Table 18: Facilitators' responses to the question "What do you believe are the most important characteristics of high quality primary literacy teaching?" (n=112)

Characteristic of literacy teaching	Number of responses	Per cent of respondents with this response
Relevant to age/ability/learning styles	46	41
In context, embedded in all areas	44	39
Explicit development of skills	43	38
Teacher knowledge	29	26
A variety of genres covered	18	16
Assessment informs planning	17	15
Enthusiasm/engaging/enjoyable	15	13
Up to date interesting resources	7	6
Whole school plan for teaching	6	5
Encourages depth	2	2
Good support	2	2
Follows first steps principles	1	1
Total responses	**230**	
No response		

Table 19: Facilitators' responses to the question "What aspects of typical primary literacy teaching need to be improved?" (n=112)

Aspects of literacy teaching to improve	Number of responses	Per cent of respondents with this response
In context, embedded in all areas	31	28
Training, teacher knowledge of literacy development is ongoing	25	22
Explicit development of skills	18	16
Assessment informs planning	16	14
A variety of genres covered/text types	14	13
Current and relevant resources	13	12
Caters for different learning styles/abilities/groups	10	9
Other	26	23
Total responses	**153**	
No response		

Beliefs about teacher professional learning

Beliefs about characteristics of high quality teacher professional learning were elicited before and after the workshop. Before the workshop the most frequently mentioned characteristics were: relevance, active participation of teachers in workshops, the provision of ongoing support, and the inclusion of critical self-reflection (Table 20). After the workshop

PLFs more frequently mentioned: stimulating and engaging delivery of workshops, credible and well-prepared presenters, collaboration and sharing between participants, and workshops supported with good resources and handouts.

Table 20: Facilitators' responses to the question "What do you believe are the most important characteristics of high quality teacher professional learning?" before and after the workshop

Characteristic	Per cent of PLFs	
	Before (n=112)	After (n=114)
Topic relevant to classrooms	82	47
Active participation of teachers in workshop	32	18
Ongoing support provided	29	18
Includes critical self-reflection	27	11
Delivery is stimulating, engaging	21	35
Recognition of experience/knowledge of participants	18	20
Based on sound pedagogy, best practice	18	18
Presenters are credible, prepared	17	22
Collaboration, sharing included		21
Good supporting resources/handouts	5	18
Balanced program (talk, do, listen, network, etc)	7	12
Fits with schools demands (funded, in school hours)	8	3
Presenters model what they teach	7	7
Ongoing and develops pedagogy, not one offs	6	
Teachers have input/choice of topic	6	
Clear outcomes	5	7
Links to current syllabus/program/outcomes	4	
Workshops are evaluated	4	
Classroom based mentoring/facilitating	2	
Follows adult education principles		2
Number of responses	**334**	**299**

The PLFs indicated that typical teacher professional learning could be improved by providing ongoing support, ensuring workshops are relevant to the classroom needs of teachers, recognition of and drawing on participants' experience and knowledge, and meeting the needs of teachers and schools by being funded and in normal school hours (Table 21).

Table 21: Facilitators' responses to the question "What aspects of typical teacher professional learning need to be improved?" (n=112)

Aspect of professional learning to improve	Number of responses	Per cent of respondents with this response
Ongoing support provided	30	27
Topic relevant to classrooms	27	24
Recognition of experience/knowledge of participants	17	15
Fits with schools demands (funded, in school hours)	11	10
Delivery is stimulating, engaging	10	9
Active participation of teachers in workshop	8	7
Classroom based mentoring/facilitating	8	7
Presenters are credible, prepared	7	6
Presenters model what they teach	7	6
Workshops are evaluated	7	6
Ongoing and developmental	6	5
Includes critical self-reflection	4	4
Based on sound pedagogy, best practice	4	4
Teachers have input/choice of topic	4	4
Balanced program (talk, do, listen, network, etc)	3	3
Supported by admin/head office	3	3
Other	14	13
Total responses	**174**	

Goals for participating in the workshop

The PLFs were asked about their personal goals for participating in the workshop. The most common responses were to learn about *Primary Connections*, how to facilitate *Primary Connections* workshops and for personal professional development (Table 22). The PLFs personal goals were consistent with the aims of the workshop program.

Table 22: Facilitators' responses to the question "What are your personal goals for participating in this workshop?" (n=112)

Goal	Number of responses	Per cent of respondents with this response
Find out about PC	55	49
How to facilitate PC workshops	47	42
Learning for oneself	43	38
Help teachers teach science better	28	25
Better links between science and literacy	23	21
Network	20	18
Link to current program	8	7
Learn effective science strategies	8	7
Ways to encourage teachers/students/schools	7	6
Implement PC across the system	6	5
Learn about 5Es model	4	4
Increase confidence	4	4
To learn to write units	2	2
Total number of responses	**255**	

Factors influencing the uptake of *Primary Connections* and their success as a facilitator

The PLFs identified factors likely to influence the uptake of *Primary Connections* in their jurisdiction and sector. The most frequently mentioned factors were financial and other resources, the priority given to the program at regional and school levels, and the time made available for planning and professional learning (Table 23).

Table 23: Facilitators' responses to the question "What factors will influence the uptake of *Primary Connections* by schools in your jurisdiction and sector?" (n=112)

Factor	Number of responses	Per cent of respondents with this response
Money, resources	53	47
Ranking of science/school or region priority	35	31
Time	30	27
Support from admin	22	20
Curriculum issues/other programs	22	20
Awareness/promotion	20	18
Staff interest	20	18
Opportunities for professional learning	20	18
Confidence levels of teachers	10	9
Skill as a presenter	7	6
Contact with facilitator	7	6
Relevant and practical program	3	3
Lack of teacher continuity in remote and rural locations	2	2
Total number of responses	**251**	

The PLFs identified the time needed for preparation and presenting workshops, resources and support from administration as the key factors likely to influence their success as *Primary Connections* professional learning facilitators (Table 23).

Table 24: Facilitators' responses to the question "What factors will influence how effective you can be as a *Primary Connections* professional learning facilitator?" (n=112)

Stages	Number of responses	Per cent of respondents with this response
Time	53	47
Money, resources	29	26
Support from admin	25	22
Skill as a presenter	20	18
Teacher belief/knowledge of program	18	16
Energy and commitment from school/teacher	18	16
Awareness/promotion	14	13
Ranking of science/school region priority	11	10
Communication with network	11	10
Access to schools	5	4
Curriculum issues/other programs	2	2
Number of responses	**206**	
No responses		

Self-efficacy and confidence as a professional learning facilitator

The PLFs rated their self-efficacy and confidence as professional learning facilitators before and after the three-day workshop. Prior to the workshop the PLFs rated their self-efficacy on a five-point agreement scale and mean ratings varied from 3.09/5 to 4.14/5 (Table 25). The lowest mean self-efficacy rating was for giving advice to early childhood teachers about teaching science (3.09/5). Using science content knowledge to answer teachers' science questions had the largest standard deviation indicating a large diversity of responses which is not surprising given that the sample included primary teachers, secondary science teachers and literacy specialists. The highest ratings of self-efficacy related to having their workshops evaluated (4.14/5) and being able to pose engaging tasks for teachers to work on in small groups (4.02/5).

Table 25: Mean self-efficacy ratings of workshop participants as professional learning facilitators before and after the workshop (n=112)

Aspect of self-efficacy as a professional learning facilitator	Before workshop		After workshop	
	Mean	s.d.	Mean	s.d.
1 I am effective in eliciting teachers' prior knowledge and beliefs and adjusting the professional learning workshop to meet the needs of the teachers	3.98	.690	4.03	.592
2 My science content knowledge enables me to answer teachers' science questions effectively	3.33	1.021	3.63	.969
3 My knowledge of effective science teaching practices enables me to answer teachers' science pedagogy questions effectively	3.61	.876	4.03	.729
4 I am quite comfortable with having my professional learning workshops evaluated	4.14	.697	4.25	.622
5 I am able to pose engaging tasks for teachers to work on in small groups in my workshops	4.02	.687	4.30	.613
6 My deep understanding of the culture of primary schooling enables me to give valuable advice to teachers on matters of primary science pedagogy	3.74	.881	4.04	.805
7 My deep understanding of the culture of early childhood education enables me to give valuable advice to ECE teachers about science pedagogy	3.09	.949	3.33	1.052
8 My deep understanding of literacy teaching practice enables me to give valuable advice on integrating literacy education into science education	3.78	.846	4.07	.771
9 I am able to choose and apply effective facilitation tools and techniques to enhance the learning of teachers in workshops	3.94	.730	4.28	.557
Mean of all mean self-efficacy ratings (/5)	3.74	.496	3.99	.422

Note. Teachers rated their self-efficacy for each item on a fve-point scale
5= SA = strongly agree, 4=A = agree, 3=UN = undecided, 2=D = disagree, 1=SD = strongly disagree

After the workshop the PLFs rating of their self-efficacy had increased on all aspects of facilitation (Table 25). The mean of item means on the scale before the workshop (3.74) increased by 0.25/5 after the workshop (3.99). The largest gain in self-efficacy was for My knowledge of effective science teaching practices enables me to answer teachers' science pedagogy questions effectively which increased from 3.61 to 4.03/5. Large gains were also made in self-efficacy related to answering science questions, posing engaging professional learning tasks, giving advice on primary science pedagogy, and using effective facilitation tools and techniques.

Teachers rated their self-efficacy on a nine-item and five-point scale, it was therefore possible to calculate a total self-efficacy score out of a maximum possible score of 45. The distribution of PLFs total self-efficacy scale scores are reported in Table 26.

Table 26: Frequency of facilitators' scores for self-efficacy as professional learning facilitators, before and after workshop (n=112)

Self-efficacy score range	Number of PLFs with this score	
	Before workshop	After workshop
1-10	0	0
11-20	1	0
21-30	22	10
31-40	80	89
41-45	8	13
Mean self efficacy score for all facilitators	33.6	35.9
S.D.	4.46	3.67

Note. PLF self-efficacy score = sum of eight self-efficacy scores for each teacher, (/45), with the most positive response given the value of 5 and the least positive the value of 1

Before the workshop, no teachers had very low self-efficacy (score of 0-10), one had low self-efficacy (11-20), 22 had modest self-efficacy (21-30), 80 had high self-efficacy (31-40) and eight had very high self-efficacy. After the workshop, the 23 PLFs with low and modest self-efficacy had been reduced to 10, and the number with high and very high self-efficacy had increased from 88 to 102. The mean self-efficacy score increased from 33.6 before the workshop to 35.9 after the workshop and the standard deviation reduced from 4.46 to 3.67 indicating a reduced spread of scores.

The PLFs also rated their confidence with facilitating professional learning on seven aspects of primary science and literacy teaching on a five-point confidence scale ranging from no confidence to very confident. These data are reported in Table 27.

Table 27: Mean ratings of confidence with facilitating professional learning workshops on aspects of primary science and literacy teaching before and after the workshop (n=112)

Aspect of facilitating	Mean score (/5)			
	Before workshop		After workshop	
	Mean	s.d.	Mean	s.d.
An introduction to *Primary Connections*	3.23	1.152	4.22	.596
Coordinating the science program in a primary school	3.73	.914	4.18	.674
Assessment of learning in primary science	3.30	1.080	4.25	.651
Conducting investigations in primary science	3.73	.934	4.22	.719
Cooperative learning strategies	4.06	.766	4.31	.672
Developing literacies needed for learning science	3.77	.891	4.13	.704
Using an inquiry model to plan primary science units of work	3.70	.969	4.02	.838
Mean of all mean confidence scores (/5)	**3.65**	**.729**	**4.19**	**.508**

Note.
NC = No confidence = 1, LC= Limited confidence =2, OK = 3, C = confident = 4, VC = Very confident = 5

Prior to the workshop mean confidence scores for the PLFs ranged from a low of 3.23/5 for facilitating professional learning on an introduction to *Primary Connections* to a high of 4.06 on cooperative learning strategies. After the workshop mean confidence scores were higher for all aspects of facilitation, and the mean of confidence scores over all seven aspects rose from 3.65 to 4.19. The greatest gains in confidence were for facilitating professional learning on an introduction to *Primary Connections* and assessment of learning in primary science. After the workshop mean scores for all aspects were greater than 4/5 which indicates a good level of confidence.

Achievement of workshop aims and adequacy of preparation

PLFs rated the extent to which the five workshop aims were achieved for them on a five-point scale ranging from To a large extent to, To a limited extent. Almost alll of the PLFs indicated that they had achieved the aims to at least the mid-point (OK) of the five-point scale. The most positive responses were for understanding the teaching and learning model and curriculum resources, and for understanding the professional learning model and resources. The lowest rating was for achieving the aim related to adapting the professional learning approach to meet the needs of different audiences.

Table 28: Achievement of workshop aims (n=114)

Workshop aim **To develop an enhanced…**	**Number of respondents with this response**				
	To a large extent		**OK**		**To a limited extent**
understanding of the *Primary Connections* project, teaching and learning model and curriculum resources	66	44	4	0	0
understanding of the *Primary Connections* professional learning model and resources	65	44	5	0	0
level of confidence and range of skills in facilitating *Primary Connections* professional learning workshops	30	67	15	1	1
ability to adapt the professional learning resources and practices to meet the needs of different audiences	27	61	23	2	1
Network of colleagues as a *Primary Connections* facilitator	48	43	20	3	0

When asked how well prepared they were for facilitating *Primary Connections* professional learning workshops, 84% indicated they were very well or well prepared, 16% said OK and none indicated they were poorly or very poorly prepared (Table 29).

Table 29: Facilitators' responses to the question "How well prepared do you feel for facilitating *Primary Connections* professional learning workshops?" (n=114)

Per cent of PLFs				
Very well prepared	Well prepared	OK	Poorly prepared	Very poorly prepared
26	58	16	0	0

In terms of further support that the PLFs anticipated they would need (Table 30), the most frequently mentioned (31% of PLFs) was further contact with other PLFs which demonstrates the importance of the workshop programs' aim of developing networks within the PLFs. Further support from the Academy (19%) including ongoing professional learning (12%),updates on new resources (14%) and a workshop set of units (7%) were mentioned. Support was also required from line managers at central/district office level (14%) or at school level (4%).

Table 30: Facilitators' responses to the question "What further support will you need for your role as a *Primary Connections* professional learning facilitator?" (n=85)

Support needed	Number of responses	Per cent of respondents with this response
Contact with other facilitators	35	31
Academy/PC team support	22	19
None (as yet)	22	15
Regular updates of resources	16	14
District office support	16	14
Ongoing PD	14	12
Money	10	9
Have buddy, mentor, co-presenter	8	7
Provide a workshop set of PC books	8	7
More time to prepare	7	6
Need to work with/observe PC trial teacher	5	4
School admin support	5	4
Need to teach PC myself first	1	1
Access to student work samples	1	1
Total responses	165	

Feedback on the workshop and resources

Feedback was facilitated from the PLFs regarding changes that could be made to the workshop to improve it. The most common response from more than one-quarter of the PLFs was that no changes were needed. Eighteen per cent suggested that day one could be shorter or include a workshop in the afternoon, and 12% suggested that the proportion of reflection time could be increased. Several other suggestions are reported in Table 31, however, none of these was made by more than 10% of participants.

Table 31: Facilitators' responses to the question "What improvements could be made to the three-day workshop for professional learning facilitators? (n=114)

Suggested improvements	Number of responses	Per cent of respondents with this response
None	31	27
Day 1- make it shorter, do a workshop pm	20	18
Do less in sessions/have more reflection time	14	12
More input/discussion with PC trial teachers	9	8
More doing, less listening	7	6
Do or model some activities	7	6
Meet state colleagues earlier/more	7	6
Make it shorter	7	6
Separate workshop on presentation skills/adult ed skills	5	4
More emphasis on literacy	5	4
Provide background reading before workshop	4	4
More time preparing modules to present at w/s	4	4
More on science as a discipline	4	4
Comment on assessment workshop	4	4
Comment on literacy workshop	4	4
Comment on cooperative learning workshop	3	3
Have different sessions for different groups	2	2
Some facilitators not prepared/up to scratch	2	2
Don't duplicate handouts in manual	1	1
Too much repetition	1	1

PLFs initial impression of the professional learning resources were very positive. Ninty-five per cent rated them as excellent or good on a five-point scale (Table 32) and the most common comments were excellent, well set out, accessible and comprehensive (Table 33). There were no negative comments about the professional learning resources.

Table 32: Facilitators' responses to the question "What is your initial evaluation of the draft *Primary Connections* professional learning resources?" (n=114)

Per cent of PLFs				
Excellent	Good	Satisfactory	Poor	Totally inadequate
65	30	2	0	0

NB. Four respondents did not answer this question

Table 33: Facilitators' responses to the question "What are your initial impressions of the draft *Primary Connections* professional learning resources?" (n=114)

Initial impression of resources	Number of responses	Per cent of respondents with this response
Excellent resource	70	61
Well set out, accessible	45	39
Comprehensive	21	18
Good for non-science specialists/new teachers	4	4
Lots of 'bits'	2	2
Good balance of media/styles	1	1
No response	5	

When asked what changes would you like made to the resources, the overwhelming response was none (62% of PLFs). A more user friendly folder was suggested by 21% and links to outcomes for each state was mentioned by seven per cent (Table 34).

Table 34: Facilitators' responses to the question "What changes would you like made to the professional learning resources?" (n=114)

Changes to professional learning resources	Number of responses	Per cent of respondents with this response
None	71	62
Folder layout - larger print, pockets for handouts, more user friendly	24	21
Give outcomes for each state	8	7
More ICT	3	3
More on literacy	2	2
Models for application in different sectors	2	2
More on assessment	2	2
Make it smaller/shorter sessions	2	2
More on cooperative learning	1	1
Include hands on session	1	1
More topics	1	1
Add extension activities	1	1
Total responses	**118**	

The last question on the post workshop questionnaire asked for 'any other comments', and typical of the positive tone of other responses on the questionnaire, the comments were overwhelmingly positive with praise for presenters, the workshop, resources, networking and accommodation.

Table 35: Facilitators' responses to the question "any other comments?" (n=61 respondents)

Comment on workshop	Number of responses	Per cent of attendees with this response (n=114)
Praise for presenters and workshop	56	49
Praise for PC, resources	11	10
Valuable networking	2	2
Want tour, excursion	2	2
Accommodation, food etc praised	1	1

Key Findings

Analysis of data presented in this report reveals a number of key findings. These are listed in the following table.

Number	Key finding	Supporting data
1	The 118 participants who attended the workshop and the 112 who completed questionnaires were drawn from all jurisdictions, sectors and rural, regional and metropolitan locations. The independent school sector is under represented with only five per cent of participants.	Tables 1-3
2	The participants were a diverse group with the majority (52%) from central or district offices. A much smaller proportion were based in schools (34%) compared with the 2006 cohort (58%). Other participants were drawn from science centres, universities and professional associations.	Table 4
3	Professional roles of participants were general education advisors (44%), science or literacy consultants (10%) or project officers (4%), others were teachers, school principals or deputies. The majority had a professional role which involved advising teachers.	Table 5
4	A majority of participants (55%) had more than 20 years of experience in education, most (75%) had significant experience in primary schooling while 71% had experience as a primary teacher of science and 72% had experience as a primary teacher of literacy or as a coordinator of literacy at their school. Almost 40% had taught with Primary Investigations and some (5%) were trial teachers or had attended the Queensland Spotlight on science *Primary Connections* workshops (4%).	Tables 5-7, 9-10
5	The participants had high confidence with science teaching with a mean item score of 3.82/5 over nine aspects of science teaching. The total mean scale score (34.4/45) was higher than for the commencing trial teachers in 2005 (30.02) but lower than for the 2006 PLFs (36.52).	Table 8
6	Only five per cent had no prior experience of professional learning facilitation. Far more of the 2007 PLFs had experience of primary science and literacy facilitation (30 and 34%) than the 2006 cohort (19 and 8%). More of the 2007 PLFs had conducted greater than five days of facilitation (62%) than the 2006 cohort (50%).	Tables 11-12

7	Most participants had a four-year initial teacher education, one-quarter has a higher degree and half had completed no more than Year 12 studies in science. Less than one-fifth were completing further studies.	Tables 13-14
8	Participants identified affective outcomes, cognitive outcomes and development of scientific literacy as purposes for teaching primary science	Table 15
9	Participants' beliefs about the characteristics of quality science teaching were largely consistent with those of the project (inquiry-based pedagogy, hands-on, quality curriculum, and high levels of teacher knowledge, skill and enthusiasm). Although 10% believed science teaching should be integrated, strong links between science and literacy were not mentioned frequently.	Table 16
10	As with the 2006 cohort, the 2007 PLFs believed that teachers' confidence and ability to teach primary science, and the status of science in the primary school curriculum need to be improved.	Table 17
11	Participants believed that literacy teaching needs to be relevant to the age group, ability and learning styles of children, taught in context and embedded in other learning areas, and that there should be explicit development of skills; and these aspects plus teacher knowledge needed to be improved in typical literacy teaching.	Tables 18-19
12	Before the workshop the most frequently mentioned characteristics of quality teacher professional learning were: relevance, active participation of teachers in workshops, the provision of ongoing support, and the inclusion of critical self-reflection. After the workshop PLFs more frequently mentioned: stimulating and engaging delivery of workshops, credible and well-prepared presenters, collaboration and sharing between participants, and workshops supported with good resources and handouts.	Table 20
13	When asked about aspects of typical professional learning that needed to be improved the PLFs focussed on the need for on-going support of teachers, relevant workshop content, workshops that build on the experience and knowledge of teachers, and attention being paid to the timing of workshops so they are included both within the school day and are funded.	Table 21
14	The most common goals of participants for the workshop were to find out about *Primary Connections*, how to facilitate workshops, personal professional development and learning how to help other teachers	Table 22
15	The main factors expected to determine the uptake of *Primary Connections* were financial and other resources, priority given to science, time, support from administration and wider curriculum issues.	Table 23
16	When asked about factors effecting how effective they will be as PLFs, the most common responses were the time needed to prepare and present the workshops, resources and support of line managers.	Table 24
17	The 2007 PLFs made strong gains in self-efficacy for professional learning facilitation. After the workshop only nine per cent of PLFs had low or modest self-efficacy (scores of 1-30/45).	Tables 25-26

18	PLFs confidence with all aspects of *Primary Connections* professional learning facilitation increased as a result of the workshop. Mean item scores increased from 3.65/5 to 4.19 which represents a larger gain in confidence than for the 2006 workshop (3.83 to 4.12).	Table 27
19	When asked about the extent to which the workshop outcomes had been achieved, no less than 77% of participants rated all the outcomes in the two highest response categories which was higher than for the 2006 workshop (73%). Most positive responses were for understanding the teaching and learning model and curriculum resources and for understanding the professional learning model and resources.	Table 28
20	Eighty-four per cent of PLFs indicated that they were very well or well prepared for their facilitation role, a marked improvement over the 66% for the 2006 workshop.	Table 29
21	The most common support needs related to ongoing contact with other PLFs and support from the Academy of Science.	Table 30
22	When asked how the workshop could be improved, the most common response was 'none' (27%). The two most common suggestions for improvement were to make Day 1 shorter or include a workshop in the afternoon (18%), and increase the proportion of reflection time (12%).	Table 31
23	The participants' initial evaluation of the professional learning resources was positive with 95% of PLFs rating the resources as excellent or good.	Table 32
24	When asked what changes they would like made to the resources, the most frequent response (61%) was 'none'. The more frequent of requests for change included making the folder more user friendly so it is easier to navigate through and locate resources.	Table 34
25	When given the opportunity to provide any other comments, responses where overwhelmingly positive with praise for the workshop, presenters, resources, networking, accommodation and meals.	Table 35

Discussion and Conclusions

The workshop attracted a most appropriate sample of participants from all jurisdictions, sectors and geographic locations and were highly experienced and well qualified except for science discipline studies. The independent school sector was under-represented in the sample with only five per cent of participants. This appears to be a reflection of this sector's approach to providing professional learning by school rather than as a system. Most participants had a primary teaching background. There was a high proportion of PLFs drawn from central and district offices and a much lower proportion of PLFs drawn from primary schools than in the 2006 cohort. Non-school based PLFs are likely to have greater capacity to deliver workshops to schools than those restricted by daily teaching commitments. The 2007 cohort of PLFs was confident about their own science teacher, however, not quite as confident as the 2006 cohort. A greater proportion of 2007 PLFs had experience of primary science and literacy facilitation, and had delivered more days of professional learning, than the 2006 cohort of PLFs.

The participants' beliefs about the purpose of primary science teaching, the characteristics of effective science teaching and beliefs about effective teacher professional learning were consistent with the research literature (e.g. Goodrum, Hackling & Rennie, 2001; Senate

Inquiry, 1998) and with the focus of the *Primary Connections* project. The participants' personal goals for attending the workshop were consistent with the aims of the workshop.

The main factors likely to influence uptake of *Primary Connections* identified by the 2007 PLFs were similar to those identified by the 2006 cohort (priority given to science within jurisdictions, resourcing, support provided by administrators and time), however, the influence of other curriculum issues and agendas was also identified as a key factor. Time available in busy workloads for preparing and delivering workshops, resources and support of line managers were the key factors identified by PLFs that are likely to limit their effectiveness. There is therefore a need for continued advocacy to make science a high priority within jurisdictions, districts and schools to ensure good support from line managers who ultimately determine access to resources and time.

The January workshop increased the confidence and self-efficacy of participants for facilitation. At the end of the workshop only nine per cent had low or modest self-efficacy. Very strong gains were made in confidence with facilitating *Primary Connections* workshops. Gains were larger than for the 2006 cohort and the mean confidence scores were also higher after the 2007 workshop than after the 2006 workshop.

The workshop was evaluated very positively by the PLFs and more positively than the 2006 cohort evaluated the success of the January 2006 workshop. No less than 77% rated achievement of the workshop aims in the two highest categories of a five-point scale, and 88% indicated they were very well or well prepared for their facilitation role. The professional learning resources were also rated very positively and feedback suggests no obvious areas in need of improvement. After the PLFs have had experience with working with the resources it is likely that they will be in a better position to provide informed views on how to improve them.

Given the quality of the workshop and resources, and the richness of the professional learning that occurred for the PLFs, it is likely that the PLFs will be effective as facilitators. Given that a large proportion of the 2007 cohort are based in central or district offices they will have more flexibility in their work commitments than teachers and a greater capacity to work within schools as facilitators. They will also have the advantages of position and communications networks to gain access to school principals and advocate for the program. Follow-up workshops will provide an opportunity to gather further data to determine the extent to which they are successful as facilitators, and a focus group would be a valuable approach to gathering data about improvements that could be made to the resources once they have experience of using them.

Further consideration needs to be given to supporting the uptake of *Primary Connections* in the independent schools sector.

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Appendices

Appendix 1: Workshop program

Making Connections

A workshop for Professional Learning Facilitators of the *Primary Connections* program

The Shine Dome, ACTON, ACT, Day 1

The Centre for Teaching and Learning, STIRLING, ACT, Days 2 & 3

17-19 January, 2007

DAY 1 **Introductory day at the Shine Dome:**

1. Opening, introductions, expectations, the Professional Learning Facilitator (PLF) role
2. Introduction to *Primary Connections* workshop
3. Setting the scene
    - Research review about linking science with literacy
    - Research review about science education and *Primary Connections*
    - Exemplary curriculum units
    - Indigenous perspectives

A WARM WELCOME TO THE FELLOWS OF THE ACADEMY IN ATTENDANCE.

DAYS 2 & 3 **Getting into the detail at the Centre for Teaching and Learning:**
A series of concurrent 90 minute model workshops exploring the major features of the program plus dedicated time for reflection, journaling and dialogue in state/territory jurisdiction groups.

Participants will be allocated to a workshop group designated by a sticker on their name tags. Workshop groups stay together for five separate workshops. Timetable schedules for the workshops will be available at Registration at the Shine Dome and on signs around the workshop spaces. The workshops and presenters are:

- **5Es teaching and learning model**
  Presenters: *Ms Louise Rostron & Ms Robyn Bull*
- **Linking science with literacy**
  Presenters: *Professor Vaughan Prain & Ms Ina Kuehlich*
- **Investigating**
  Presenters: *Professor Mark Hackling & Ms Louise Nielsen*
- **Assessment for learning**
  Presenters: *Ms Nola Shoring & Ms Claudette Bateup*
- **Cooperative learning**
  Presenters: *Ms Kathy Harris & Ms Barbara Kroll*

DAY 1 INTRODUCTORY DAY AT THE SHINE DOME

TIME	FOCUS	PRESENTER/S
8.30 (60mins)	**Registration and collection of workshop satchels** **Tea and coffee**	
9.30 (30mins)	**Welcome addresses** MC: Ms Louise Rostron Professional Learning Support Officer Australian Academy of Science	Professor Kurt Lambeck President Australian Academy of Science Mr Scott Lambert Director, Science and Maths Section, Curriculum Branch, Schools Outcomes Group Department of Education, Science and Training
10.00 (10mins)	**Introductions** *Primary Connections* team Research Consultants Introduce yourself to the people nearest you	Ms Shelley Peers Managing Director, *Primary Connections* project Australian Academy of Science
10.10 (15mins)	**Opening Address** • Purpose of *Primary Connections* • Purpose of the PLF workshop • Strategic position and role of the PLF • Origin of *Primary Connections*	Shelley Peers
10.25 (5mins)	**Housekeeping**	Ms Shannon Newham Executive Assistant, Education & Public Awareness Australian Academy of Science
10.30 (30mins)	**Parking lot** **Affinity diagram – expectations** "What do you hope to know and be able to do by the end of the 3 days?"	Louise Rostron & *Primary Connections* team
11.00 (30mins)	**Morning Tea** (Affinity diagram collated)	
11.30 (5mins)	**Overview of Affinity diagram**	Louise Rostron
11.35 (85mins)	**Introduction to PC** A "model" session for PLF delivery	*Primary Connections* team
1.00 (45mins)	**Lunch**	
1.45 (30mins)	**Setting the Scene** • Academic/research review about linking science with	Professor Vaughan Prain Research Consultant to *Primary Connections* La Trobe University

	literacy • Labelling a diagram	
2.15 (30mins)	**Reflection and Journaling processes** • Overview processes • "Question Generator" • Review parking lot	Professor Mark Hackling Research Consultant to *Primary Connections* Edith Cowan University Louise Rostron
2.45 (30mins)	**Setting the Scene** Academic/research review of science education and underpinning research of *Primary Connections*	Professor Mark Hackling
3.15 (30mins)	**Afternoon Tea**	
3.45 (30mins)	**Setting the Scene** • Orientation to exemplary curriculum units which put *Primary Connections* into practice • Science Background CD • Website resources	Ms Claudette Bateup Unit Coordinator, *Primary Connections* project Australian Academy of Science
4.15 (15mins)	**Setting the Scene** Indigenous Perspective, its philosophy and learning strategies	Ms Robyn Bull Project Officer, *Primary Connections* project Australian Academy of Science
4.30 (30mins)	**Preparation for Days 2 & 3** • Explain the workshop process for Days 2/3 • Evaluation process: Reflection and journaling; 5Rs and DIGA • Review parking lot and questions	*Primary Connections* team
5.00	State and Territory photographs	Ms Jacinta Legg Education and Public Awareness Officer Australian Academy of Science
5.30 (30mins)	History of the *Dome* presentation (Optional)	
6.00-8.00	Drinks, Barbeque at the Shine Dome	

DAY 2 GETTING INTO THE DETAIL AT THE CENTRE FOR TEACHING AND LEARNING

TIME	FOCUS	PRESENTER/S
8.00	Meet for bus (from *Olims* or Academy)	
8.15	Buses depart for the Centre for Teaching and Learning, Stirling, ACT	
8.45 (15mins)	Meet in Hall, allocate groups, clarify process	*Primary Connections* team

9.00 (90min)	**Workshop 1 in allocated groups**	All workshop presenters
10.30 (30mins)	**Morning Tea** (Informal networking, questions for parking lot)	
11.00 (90min)	**Workshop 2 in allocated groups**	All workshop presenters
12.30 (45mins)	**Lunch** (Informal networking, questions for parking lot)	
1.15 (90mins)	**Workshop 3 in allocated groups**	All workshop presenters
2.45 (30mins)	**Afternoon Tea** (Informal networking, questions for parking lot)	
3.15 (45mins)	**Reflection and dialogue** in state/territory jurisdiction groups using suggested structured processes	All
4.00 (45mins)	Meet in Hall, process questions, issues, concerns	*Primary Connections* panel
4.45	Buses return (to *Olims* or the Academy)	
6.30	Meet for bus (from *Olims* or the Academy)	
6.45	Buses depart for *The Boat House by the Lake* (Grevillea Park, Menindee Drive, Barton)	
7.00	Dinner at *The Boat House by the Lake*	After dinner speaker: Professor Julie Campbell Secretary, Education & Public Awareness Australian Academy of Science
10.15	Buses depart from *The Boat House by the Lake* (for *Olims* or the Academy)	

DAY 3 GETTING INTO THE DETAIL (continued)

TIME	**FOCUS**	**PRESENTER/S**
8.00	Meet for bus (from *Olims* or the Academy)	
8.15	Buses depart for the Centre for Teaching and Learning, Stirling, ACT	
8.45 (15mins)	Meet in Hall, clarify process	
9.00 (90mins)	**Workshop 4 in allocated groups**	All workshop presenters
10.30 (30mins)	**Morning Tea** (Informal networking, questions for parking lot)	
11.00 (90mins)	**Workshop 5 in allocated groups**	All workshop presenters

12.30 (45mins)	**Lunch** (Informal networking, questions for parking lot)	
1.15 (45mins)	**Bringing it all together** • Synthesis of workshops **Implementation Strategies** • Action planning • Holden/Rolls Royce model • Role of school co-ordinators	Professor Mark Hackling
2.00 (45mins)	**State/territory jurisdiction meetings** • How does *Primary Connections* work in our state? • What support do we provide? • How is it co-ordinated?	State & Territory Co-ordinators
2.45 (15mins)	**Afternoon Tea**	
3.00 (30mins)	**Reflection and dialogue** in state/territory jurisdiction groups using suggested structured processes	PC Team facilitate the process
3.30 (60mins)	**All together again** • What support does the Academy provide? • Post questionnaire • Re-visit expectations • Process parking lot and questions	Shelley Peers & *Primary Connections* team
4.30	**Close and farewell**	Shelley Peers
5.00	**Buses to airport to arrive at airport at 5.30pm**	

Appendix 2: Initial questionnaire

Australian Academy of Science: *Primary Connections* Program
Professional Learning Facilitators Initial Questionnaire

Dear Colleague
We seek your views about professional learning for teachers of primary science and literacy. Data from this survey will be aggregated and summarised so that it will not be possible to identify any respondent in any reports of this research. Data will be used for research purposes only. We request your name and workplace details for follow-up purposes only.

Please answer this questionnaire honestly and frankly. Respond in the way that it is, rather than portraying things as you would like them to be seen.

Professor Mark W Hackling
Edith Cowan University

ID number

For office use only

Your background

Your name: _____ Sex: Male / Female

State/Territory: _____ Sector: Government / Catholic / Independent / Other

Name of workplace for 2007: _____

Location of workplace: Metropolitan / Regional / Rural

Your professional role for 2007: _____

How long have you been in this role? _____ years

Your professional experience – please complete the table below

Professional role (e.g., teacher, education officer etc)	Workplace (e.g., Primary School, Secondary School, Education System Office)	Number of years

Please outline your teaching experience in science and literacy

_____

_____

_____

Were you a *Primary Connections* trial teacher in 2005? Yes / No

Did you complete the two-day workshop *Spotlight on Primary Connections* at Brisbane or Cairns in 2006? Yes / No

Have you previously taught science using *Primary Investigations*? Yes / No

Qualifications
List all of your completed post-secondary qualifications e.g. Bed / BA, Dip Ed / MEd

_____

Highest level of science content/discipline studies (not science education). Tick box.

Year 10	Year 12	1–3 undergraduate science units	Undergraduate science major	Postgraduate science qualification e.g. MSc

List any current studies e.g. Graduate Certificate (Computer Education)

_____

Summarise your experience in facilitating professional learning for other teachers

Topic of professional learning workshops you have facilitated	Learning area and level (e.g. primary maths, secondary science)	Total number of hours of workshops

About primary science and literacy teaching

What do you believe is the main purpose of teaching science in the primary years of schooling?

What do you believe are the most important characteristics of high quality primary science teaching?

What aspects of typical primary science teaching need to be improved?

What do you believe are the most important characteristics of high quality primary literacy teaching?

What aspects of typical primary literacy teaching need to be improved?

Confidence with aspects of science teaching

Please rate your confidence with the following aspects of science teaching

VC = Very confident; C = Confident;
LC = Limited confidence; NC = No confidence

Item	Aspect	VC	C	OK	LC	NC
1	Engaging students' interest in science					
2	Managing hands-on group activities in science					
3	Managing discussions and interpretation of science observations					
4	Explaining science concepts					
5	Teaching science processes					
6	Developing literacy skills needed for learning science					
7	Assessing children's learning in science					
8	Using computers and ICTs in science					
9	Using an inquiry model to plan science units of work					

About professional learning

What do you believe are the most important characteristics of high quality teacher professional learning?

What aspects of typical teacher professional learning need to be improved?

Your self-efficacy and confidence as a professional learning facilitator

Please indicate the degree to which you agree or disagree with each statement below by ticking the appropriate box to the right of each statement:

SA = Strongly Agree; A = Agree; UN = Uncertain;
D = Disagree; SD = Strongly Disagree

Item	Statement	SA	A	UN	D	SD
1	I am effective in eliciting teachers' prior knowledge and beliefs and adjusting the professional learning workshop to meet the needs of the teachers					
2	My science content knowledge enables me to answer teachers' science questions effectively					
3	My knowledge of effective science teaching practices enables me to answer teachers' science pedagogy questions effectively					
4	I am quite comfortable with having my professional learning workshops evaluated					
5	I am able to pose engaging tasks for teachers to work on in small groups in my workshops					
6	My deep understanding of the culture of primary schooling enables me to give valuable advice to teachers on matters of primary science pedagogy					
7	My deep understanding of the culture of early childhood education enables me to give valuable advice to ECE teachers about science pedagogy					
8	My deep understanding of literacy teaching practice enables me to give valuable advice on integrating literacy education into science education					
9	I am able to choose and apply effective facilitation tools and techniques to enhance the learning of teachers in workshops					

Please rate your confidence with facilitating professional learning workshops focusing on the following aspects of primary science and literacy teaching

VC = Very confident; C = Confident;
LC = Limited confidence; NC = No confidence

Item	Aspect	VC	C	OK	LC	NC
1	Introducing *Primary Connections* and its five underpinning principles					
2	Linking science with literacy					
3	Understanding and applying the 5Es teaching and learning model in primary science					
4	Conducting investigations in primary science					
5	Using co-operative learning strategies					
6	Using embedded assessment processes and effective questioning techniques					
7	Co-ordinating the science program in a primary school					

Primary science in your jurisdiction and sector

What factors will influence the uptake of *Primary Connections* by schools in your jurisdiction and sector?

What factors will influence how effective you can be as a *Primary Connections* professional learning facilitator?

Your goals for participating in this three-day workshop for professional learning facilitators

What are your personal goals for participating in this workshop?

Thank you for responding to this questionnaire

Appendix 3: Workshop evaluation survey

Australian Academy of Science: *Primary Connections* Program
Professional Learning Facilitators Workshop
Workshop Evaluation Survey

Dear Colleague
We seek your views about the professional learning facilitators workshop you have just completed. Data from this survey will be aggregated and summarised so that it will not be possible to identify any respondent in any reports of this research. Data will be used for research purposes only. We request your name for follow-up purposes only.

Please answer this questionnaire honestly and frankly. Respond in the way that it is, rather than portraying things as you would like them to be seen.

Professor Mark W Hackling
Edith Cowan University

ID number

For office use only

Your background

Your name: _____

State/Territory: _____

About professional learning

What do you believe are the most important characteristics of high quality teacher professional learning?

Your self-efficacy and confidence as a professional learning facilitator

Now that you have completed this three-day workshop, please indicate the degree to which you agree or disagree with each statement below by ticking the appropriate box to the right of each statement:

SA = Strongly Agree; A = Agree; UN = Uncertain;
D = Disagree; SD = Strongly Disagree

Item	Statement	SA	A	UN	D	SD
1	I am effective in eliciting teachers' prior knowledge and beliefs and adjusting the professional learning workshop to meet the needs of the teachers					
2	My science content knowledge enables me to answer teachers' science questions effectively					
3	My knowledge of effective science teaching practices enables me to answer teachers' science pedagogy questions effectively					
4	I am quite comfortable with having my professional learning workshops evaluated					
5	I am able to pose engaging tasks for teachers to work on in small groups in my workshops					
6	My deep understanding of the culture of primary schooling enables me to give valuable advice to teachers on matters of primary science pedagogy					
7	My deep understanding of the culture of early childhood education enables me to give valuable advice to ECE teachers about science pedagogy					
8	My deep understanding of literacy teaching practice enables me to give valuable advice on integrating literacy education into science education					
9	I am able to choose and apply effective facilitation tools and techniques to enhance the learning of teachers in workshops					

Now that you have completed this three-day workshop, please rate your confidence with facilitating professional learning workshops on the following aspects of primary science and literacy teaching

VC = Very confident; C = Confident;
LC = Limited confidence; NC = No confidence

Item	Aspect	VC	C	OK	LC	NC
1	Introducing *Primary Connections* and its five underpinning principles					
2	Linking science with literacy					
3	Understanding and applying the 5Es teaching and learning model in primary science					
4	Conducting investigations in primary science					
5	Using co-operative learning strategies					
6	Using embedded assessment processes and effective questioning techniques					
7	Co-ordinating the science program in a primary school					

Feedback on the three-day professional learning facilitators workshop

To what extent have the aims of the workshop been achieved for you?

Aim To develop an enhanced……..		To a limited extent		OK		To a large extent
		1	2	3	4	5
1	understanding of the *Primary Connections* project, teaching and learning model and curriculum resources					
2	understanding of the *Primary Connections* professional learning model and resources					
3	level of confidence and range of skills in facilitating *Primary Connections* professional learning workshops					
4	ability to adapt the professional learning resources and practices to meet the needs of different audiences					
5	network of colleagues as a *Primary Connections* facilitator					

How well prepared do you feel for facilitating *Primary Connections* professional learning workshops?
Tick one box.

Very poorly prepared	Poorly prepared	OK	Well prepared	Very well prepared

What improvements could be made to the three-day workshop for professional learning facilitators?

_____

_____

_____

_____

What further support will you need for your role as a *Primary Connections* professional learning facilitator?

_____

_____

_____

Feedback on the *Primary Connections* professional learning resources

What is your initial evaluation of the draft *Primary Connections* professional learning resources?

_____

_____

_____

The draft professional learning resources are…. (tick one box)

Totally inadequate	Poor	Satisfactory	Good	Excellent

What changes would you like made to the professional learning resources?

_____

_____

_____

Any other comments

_____

_____

_____

_____

Thank you for responding to this questionnaire