PrimaryConnections®
Linking science with literacy

Stage 3
Interim research and evaluation report 12

**WA Professional Learning Facilitators
Workshop: September 2007**

A research report for the Australian Academy of
Science

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Contents   Page

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, Employment and Workplace Relations. 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 programme 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 programme and trialling the programme 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 programmes. *Primary Connections* is unique in that it involves providing professional learning for both pre- and in-service teachers in an attempt to reform science teaching in Australian primary schools.

Professional learning

Research tells us that teacher professional learning is most effective when it: is systematic and has system and school level leadership (Sparkes & Loukes-Horsley, 1990); addresses the needs of both pre- and in-service teachers (Anderson & Michener, 1994); involves teachers working collaboratively (Ingvarson & Loughran, 1997); combines curriculum resources and professional development which is ongoing (Goodrum, Hackling & Trotter, 2003; Kahle & Boone, 2000; Tinoca, 2004) and, addresses teachers' pedagogical content knowledge, beliefs and practice (Keys, 2003; Sheffield, 2004). The *Primary Connections* professional learning model for in-service teachers combines a number of these elements.
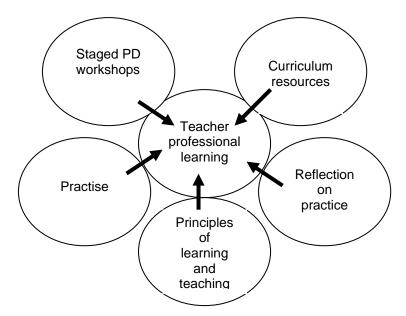
Figure 1: The *Primary Connections* professional learning model (Hackling & Prain, 2005)

Initial workshops conducted with teachers by trained professional learning facilitators (PLFs) explain and model new teaching approaches which are exemplified in the curriculum resources. Following the workshop, teachers practice teaching using these new approaches supported with the *Primary Connections* curriculum units. Follow-up workshops provide an opportunity for reflection on practice and collegial support and problem solving. The professional learning programme and resources are based on a set of principles of teaching and learning to ensure their coherence.

To provide curriculum leadership and coordination of science programmes in primary schools, two-day Curriculum Leader workshops have also been provided to an additional 550 teachers from all sectors across Australia.

To complement the provision of professional learning at the in-service level, two-day workshops have also been conducted for university science educators from all Australian universities offering teacher education courses to support them incorporate the *Primary Connections* approach and curriculum resources into their pre-service teacher education programmes.

Professional learning facilitators
To support the widespread implementation of *Primary Connections* and the reform of science teaching in primary schools, a large cohort of trained Professional Learning Facilitators (PLFs) is required to conduct workshops with teachers in schools across all jurisdictions and sectors. In January 2006 and 2007 two groups of 89 and 118 PLFs participated in three-day workshops conducted in Canberra by the Australian Academy of Science. Research indicates that: most PLFs appear highly satisfied with the training they received at the January 2006 and 2007 workshops and with the professional learning resources; most PLFs have a high level of self-efficacy and confidence for facilitation; and, teachers are satisfied with the quality of workshops facilitated by the PLFs (Hackling & Prain, 2007).

At the June 2007 *Primary Connections* Reference Group meeting, representatives of the jurisdictions indicated they had a need for a larger number of trained PLFs and they indicated a desire to exercise greater ownership over PLF training. Following this, the *Primary Connections* Management Group resolved that the Australian Academy of Science would conduct PLF training workshops collaboratively with jurisdictions within jurisdictions.

The first of these was conducted in Sydney in July 2007 (Hackling, 2008) and the second in Perth in September 2007. This report outlines research findings from the Perth workshop and benchmarks outcomes against the 2007 January PLF workshop conducted in Canberra.

Method

A total of 34 participants were recruited by the WA Department of Education and Training in collaboration with the Catholic Education Office and the Association of Independent Schools of Western Australia and were provided with a three-day workshop in Perth to train them as professional learning facilitators. An outline of the professional learning workshop is attached at Appendix 1.

The intended outcomes for the workshop were to develop an enhanced:

- 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; and,
- 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 rating 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. Rating 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 programme 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
Thirty-four participants attended the workshop; of these only 26 completed both the initial and end of workshop questionnaires. Of the 33 who completed the initial questionnaire, 26 were from the Government, three from Catholic and one from Independent sectors.

Table 1: Origin of participants by sector (n=34)

Sector	Number	Percent
Government	28	85
Catholic	3	9
Independent	1	3
Other	1	3
No response (did not do initial qu're)	1	3

The participants were drawn from central and district offices (50%), primary schools (41%), secondary schools (6%) and from a professional association (3%). The high proportion of participants who were not based in schools (53%) without teaching commitments suggests that this cohort may have the flexibility to facilitate workshops across schools in a district.

Table 2: Workplace of participants (n=32)

Workplace	Number	Per cent
Central and district offices	16	50
Primary school	13	41
Professional association	1	3
Secondary school	2	6
Total	32	

The proportion of school-based participants (47%) at this workshop was much lower than for the NSW PLF workshop (96%) conducted in June 2007 (Hackling, 2008). The January 2007 cohort of PLFs trained in Canberra comprised 34% primary school staff (Hackling, 2007).

The majority of WA PLFs were drawn from metropolitan locations (69%) while 19% were from regional and 12% from rural locations.

Qualifications
The PLFs had a range of teacher education qualifications. About three-fifths had completed a four-year BEd, one-quarter had completed a postgraduate diploma and the remainder were three-year trained. Two of the PLFs had a masters degree.

Sixty-one per cent had studied no science beyond Year 12 while 24% had a science major in their degree which indicates that the cohort was quite diverse in science background. Three of the PLFs were currently completing further study. Forty per cent of the January 2007 group had either completed or were studying for a masters or doctoral award (Hackling, 2007).

Professional roles and experience
The professional roles of PLFs and their years of experience are reported in Tables 3 and 4.

Table 3: Professional roles of facilitators (n=32)

Role in 2007	Number	Per cent
General education advisor	16	50
Class teacher	10	31
Literacy consultant	2	6
Science coordinator	3	9
Deputy	1	3

Many of the participants were general education advisors or consultants while about one-third were classroom teachers whilst others had leadership responsibilities within their schools as science coordinators or deputy principals. None of the participants were *Primary Connections* trial teachers, however, almost 70% had taught with *Primary Investigations* and would have been familiar with the 5Es model and cooperative learning strategies.

Approximately half of the participants had 10 years or less professional experience while 30% had more than 20 years experience (Table 4). Eight participants had five or less years of experience.

Table 4: Years in employment in education sector (n=33)

Years of employment in education sector	Number of responses	Per cent
5 or less	8	24
6 to 10	8	24
11 to 15	3	9
16 to 20	4	12
21 to 25	5	15
26 to 30	4	12
31 to 35	1	3
More than 35	0	0

The majority had experience of primary science teaching (84%) and with primary literacy teaching (71%).

Experience in facilitating professional learning for other teachers
The participants' experience with facilitating teacher professional learning is reported in Tables 5 and 6. All but one had facilitation experience and 48% had more than five days of facilitation experience. Almost half had primary science facilitation experience and many had facilitated professional learning in more than one learning area. Half of the January 2007 cohort of centrally trained PLFs and 28% of the NSW trained PLFs had more than five days of facilitation experience. The high level of facilitation experience for the Canberra and Perth cohorts is likely to be related to the high proportion of central and district office staff in these groups.

Table 5: Experience in facilitating professional learning for teachers (n=33)

Area of facilitation experience	Number	Per cent
No experience	1	3
Science, primary	15	45
Literacy, primary	5	15
Numeracy, primary	5	15
General education, primary	6	18
Multiple learning areas, primary	7	21
Other primary areas	1	3
Secondary	4	12

Table 6: Extent of facilitation experience (n=33)

Days of facilitating experience	None	1 to 5 days	> 5 days	No response
Number	1	14	16	2
Per cent	3	43	48	6

Beliefs about primary science and literacy teaching
On the pre-workshop questionnaire, teachers were asked about the purpose and characteristics of quality primary science teaching and what aspects of typical science teaching need to be improved. Similar questions were asked about literacy teaching. These data are reported in Tables 7-10.

Most of the participants believed that the purpose of primary science teaching is to develop cognitive learning outcomes, about half mentioned affective outcomes while some mentioned scientific literacy (Table 7).

Table 7: Participants' responses to the question "What do you believe is the main purpose of teaching science in the primary years of schooling?" (n=33)

Main purpose	Number of responses	Per cent of respondents
Cognitive	30	91
Affective	16	48
Scientific literacy	5	15
Total responses	*51*	

When asked about the characteristics of high quality science teaching, most responses related to characteristics of the teacher, pedagogy and curriculum. Participants believed that the teacher should be knowledgeable, skilful, enthusiastic and engaging, and that the pedagogy and curriculum should be hands-on, inquiry-based, relevant, integrated and include higher order thinking (Table 8).

Table 8: Participants' 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 (n=33)
Enthusiasm, engagement, motivation	19	58
Curriculum good, relevant	16	48
Hands on, practical	16	48
Teacher knowledge and skill	13	39
Pedagogy inquiry based	11	33
Integrated	5	15
All of quality teaching framework	5	15
Resources	4	12
Includes problem solving and higher order thinking	3	9
System support	1	3
Includes group work	1	3
Total responses	**96**	

The two most frequently mentioned aspects of science teaching that the participants believed need to be improved were teacher knowledge and a more inquiry-oriented pedagogy. Integration of the curriculum, availability of resources and teacher confidence were also frequently mentioned. Teacher confidence and knowledge for teaching science were mentioned far more frequently (76%) by the January 2007 group of PLFs (Hackling, 2007).

Table 9: Participants' responses to the question "What aspects of typical primary science teaching need to be improved?" (n=31)

Aspect of teaching to be improved	Number of responses	Per cent of respondents
Teacher knowledge	10	32
Pedagogy inquiry based	10	32
Active learning, transfer from doing to writing	7	23
Integrated	6	19
Classroom resources available, access, storage	6	19
Confidence/ability to teach/use resources	5	16
Importance/ranking	4	13
More training for undergraduate teachers	4	13
More on links to literacy	3	10
Assessment, support for T's on this	1	3
Student centred resources	1	3
Number of responses	**59**	
No response	2	

When asked about characteristics of quality literacy teaching, the most frequent responses related to explicit development of skills and relevance to the age and ability of the students (Table 10). Literacy learning that is enjoyable and engaging, embedded in context with a variety of genres covered were also mentioned frequently.

Table 10: Participants' responses to the question "What do you believe are the most important characteristics of high quality primary literacy teaching?" (n=33)

Characteristic of quality literacy teaching	Number of responses	Per cent of respondents
Explicit development of skills	13	39
Relevant to age/ability	13	39
In context, embedded in all areas	10	30
Enthusiasm/engaging/enjoyable	10	30
A variety of genres covered	9	27
Caters for different learning styles/abilities	5	15
Quality teaching strategies/framework	5	15
Up to date interesting resources	4	12
Teacher knowledge and pd on literacy development.	4	12
Assesses/monitors levels → early detection, correct level (assessment informs planning	2	6
Total responses	**75**	
No response		

The most common suggestion (30%) for improving literacy teaching was to embed literacy learning in all learning areas; a view which is totally consistent with the *Primary Connections* approach of integrating science and literacy learning. Other improvements mentioned by participants included extending the range of genres (17%), explicit development of skills (17%) and the provision of current and relevant resources (17%), all of which are addressed by the *Primary Connections* programme.

Beliefs about professional learning
The participants were asked about the characteristics of high quality teacher professional learning. The most frequently mentioned aspects prior to the workshop were active participation of teachers in the workshop, relevance of topic and engaging presentation. Following the workshop active participation, relevance of topic and credible and prepared presenters were the most frequently mentioned (Table 11).

Before the workshop, the participants were also asked what aspects of typical teacher professional learning need to be improved. Engaging presentation (34%), relevance of topic (31%) and active participation of teachers (24%) were key issues for the PLFs.

Table 11: Participants' responses to the question "What do you believe are the most important characteristics of high quality teacher professional learning?"

Characteristic	Pre-workshop survey (n=31)		Post- workshop survey (n=26)	
	Number	Per cent	Number	Per cent
The topic				
Topic relevant to classrooms	12	38	12	46
Readily transferable to classroom	6	19	1	4
Teachers have input/choice of topic	2	6	6	23
Links to current syllabus/programme/outcomes	2	6	0	0
Based on sound pedagogy, best practice	1	3	4	15
The workshop				
Active participation of teachers in workshop, apply in workshop	16	50	13	50
Delivery is stimulating, engaging	14	44	9	35
Presenters are credible, prepared	7	22	11	42
Recognition of experience/knowledge of participants	5	16	0	0
Balanced programme (talk, do, listen, network, etc)	4	13	1	4
Presenters model what they teach	3	9	3	12
Includes critical self-reflection	2	6	2	8
Network development	0	0	4	15
After the workshop				
Ongoing support provided	6	19	3	12
Good supporting resources/handouts	4	13	3	12
Logistics				
Supported by admin	0	0	3	12
Fits with schools demands (funded, in school hours)	0	0	1	4
Total responses	**84**		**76**	

Uptake of *Primary Connections* in your jurisdiction
To identify the potential barriers to uptake of *Primary Connections* in WA, the participants were asked on the pre-workshop questionnaire about factors that would influence the uptake of the programme and their effectiveness as a PLF. These data are reported in Tables 12 and 13.

The most frequently mentioned potential barriers to uptake of *Primary Connections* were money/resources, access to professional learning, time for professional learning, availability of teacher relief and support from administration (Table 12). It is interesting to note that availability of *Primary Connections* units, which has been a concern for some PLFs in previous workshops, was mentioned by only two participants.

Table 12: Participants' responses to the question "What factors will influence the uptake of *Primary Connections* by schools in your jurisdiction and sector?" (n=33)

Factor	Number of responses	Per cent of respondents
Money, resources	14	44
PD on PC	9	28
Time	8	25
Teacher relief availability	7	22
Support from admin	7	22
Skill as a presenter	5	16
Staff interest	4	13
Awareness/promotion	4	13
Quality of professional learning	4	13
Availability of PC units	2	6
Confidence in teachers	2	6
Ranking of science as a school or region priority	1	3
Access to schools	1	3
Total number of responses	**68**	

Prior to the workshop, the participants were also asked what factors were likely to limit their effectiveness as PLFs. The most frequently mentioned factors were: understanding of science and *Primary Connections* which is not surprising since none of the PLFs were trial teachers; time and support from administration which are related as the support of the line manager is needed to give facilitation a priority within their workloads; awareness and promotion of their role and their availability; and, resources (Table 13).

Table 13: Participants' response to the question "What factors will influence how effective you can be as a *Primary Connections* professional learning facilitator?" (n=33)

Factors	Number of responses	Per cent of respondents
Understanding of science and PC	9	29
Time	8	26
Awareness/promotion	8	26
Money, resources	8	26
Support from administration	8	26
Other commitments/availability	5	16
Quality of initial professional learning	3	10
Skill as a presenter	2	6
Ranking of science/school region priority	1	3
Number of responses	**52**	
No responses		

Goals for participating in the workshop

Most of the participants' responses to a question about their goals for the workshop related to personal concerns of learning how to facilitate *Primary Connections* workshops, to find out about the programme and to improve their own teaching. It should be noted that none of the participants were trial teachers with a good working knowledge of *Primary Connections*. Other had concerns about helping colleagues improve their science teaching or helping to implement the programme across the system (Table 14).

Table 14: Participants' responses to the question "What are your personal goals for participating in this workshop?" (n=33)

Goal	Number of responses	Per cent of respondents
How to facilitate PC workshops	20	63
Find out about PC	19	59
Learning for oneself	6	19
Network	4	13
Improve links between science and literacy	4	13
Help teachers teach science better	4	13
Implement PC across the system	1	3
Total number of responses	**59**	

Feedback on the workshop

The PLFs gave positive responses about their achievement of the aims for the workshop. More than 90% of the PLFs indicated they had achieved three of the five aims *to a large extent* or *Quite a lot*. The PLFs were a little less positive about their skills and confidence for facilitation (81% in top two categories) and their understanding of principles of effective professional learning (85%). Levels of achievement of workshop aims were very similar to those attained for the January 2007 group.

Table 15: PLFs' responses to the question "To what extent do you feel the aims of the workshop have been achieved?" (n=27)

Workshop aim	Number of PLFs with this response				
	To a large extent	Quite a lot	OK	A bit	To a limited extent
Understanding of the *Primary Connections* project, teaching and learning model and curriculum resources	24	3	0	0	0
Understanding of the *Primary Connections* professional learning model and resources, and how it can be adapted to a wide variety of settings and jurisdictional structures and cultures	23	3	1	0	0
Understanding of principles of effective professional learning	14	9	4	0	0
Skills and confidence of facilitation professional learning workshops based on *Primary Connections* resources	16	6	5	0	0
Network of colleagues with whom you could discuss issues that arise as a *Primary Connections* facilitator	20	6	1	0	0

A large majority of the PLFs (92%) indicated that they were *Very well prepared* or *Well prepared* for their facilitation role (Table 16) which was a more positive outcome than for the NSW PLF workshop (87%) and the January 2007 group (84%).

Table 16: PLFs' responses to the question "How well prepared do you feel for facilitating *Primary Connections* professional learning workshops?" (n=27)

	Per cent of PLFs				
	Very well prepared	Well prepared	OK	Poorly prepared	Very poorly prepared
WA Sep 07	33	59	7	0	0
NSW July 07	39	48	9	4	0
Canberra Jan 07	26	58	16	0	0

Two-thirds of the PLFs indicated that no changes were needed to improve the workshop. Three PLF suggested the workshop could be extended by a day and two would have liked more time to work through the folder. Three wanted access to the PowerPoint slides used in the workshops, however, this is likely to be a misunderstanding as the slides are normally made available to participants on a CD.

When asked what further support they would need, the most common responses related to ongoing support from the Academy of Science, updates on resources and contact with other PLFs. Some (5 PLFs) thought that they needed to teach with *Primary Connections* themselves before facilitating workshops.

Table 17: PLFs' responses to the question "What further support will you need for your role as a *Primary Connections* professional learning facilitator?" (n=24)

Support needed	Number of responses	Per cent of respondents
Academy/PC team support	9	38
Regular updates of resources	7	29
Contact with other facilitators	5	21
Need to teach PC myself first	5	21
Have buddy, mentor, co-presenter	4	17
Contact/support via phone/email for when problems arise	2	8
More time to prepare	1	4
Ongoing PD	1	4
Money	1	4
Total responses	38	
Number who did not respond to question	9	

Feedback on the professional learning resources
The PLFs gave a very positive evaluation of the professional learning resources with all indicating they were excellent or good. When asked to comment on the resources, the most frequent comments were excellent (91%), well set out (35%) and comprehensive (26%). One PLF would have liked the resources to be linked to outcomes for WA and one would have liked more workshop topics included.

Table 18: PLFs' responses to the question "What is your initial evaluation of the draft *Primary Connections* professional learning resources?" (n=27)

Per cent				
Excellent	Good	Satisfactory	Poor	Totally inadequate
89	11	0	0	0

PLFs' confidence and self-efficacy
The PLFs responded to scales relating to confidence with science teaching, and confidence and self-efficacy for facilitation. The PLFs rated themselves prior to the workshop on all scales and for confidence and self-efficacy after the workshop.

Confidence with science teaching
Prior to the workshop the PLFs rated their confidence with aspects of science teaching on a five-point scale ranging from *No confidence* (1) to *Very confident* (5). The PLFs were most confident with managing hands-on group activities (4.04/5) and engaging students' interest in science (4.00). They were least confident with explaining science concepts (3.44) and assessing children's learning in science (3.52). Some of the standard deviations were large indicating a wide range in the PLFs' responses and variation within the group of PLFs. The overall mean for all items in the scale (3.70/5) was lower than the overall mean for the January 2007 group (3.82/5). The WA group of PLFs had a reasonable level of confidence with their own science teaching, above the rating *OK* (3/5) and close to the rating *Confident* (4/5) but well below the rating *Very confident* (5/5), however, there was considerable variation within the group as indicated by the large standard deviations.

Table 19: Mean ratings of confidence with aspects of science teaching

Aspect of teaching	Mean rating of aspect by all facilitators (/5)			
	Initial survey WA 2007 (n=27)		Initial survey Jan 2007 (n=112)	
	Mean	sd	mean	sd
1. Engaging students' interest in science	4.00	.832	4.23	.735
2. Managing hands-on group activities in science	4.04	.808	4.13	.900
3. Managing discussions and interpretation of science observations	3.67	1.000	3.88	.928
4. Explaining science concepts	3.44	1.050	3.59	.991
5. Teaching science processes	3.70	1.068	3.71	.980
6. Developing literacy skills needed for learning science	3.62	.697	3.92	.840
7. Assessing children's learning in science	3.52	.893	3.70	.890
8. Using computers and ICTs in science	3.59	1.118	3.45	.966
9. Using a constructivist model to plan science units of work	3.78	1.013	3.79	.882
Mean of individual means of confidence ratings (/5)	3.70		3.82	

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

Self-efficacy as a PLF
The PLFs responded to a self-efficacy as a professional learning facilitator scale before and after the workshop to assess the impact of the workshop on the PLFs' beliefs about their perceived effectiveness as a facilitator. PLFs responded to nine items on a five-point scale and mean ratings were calculated for those who completed the pre- and post-workshop questionnaires.

Table 20: Mean self-efficacy ratings as a PLF

Aspect of self-efficacy as professional facilitator	Mean score (/5)							
	WA Sept 2007 workshop (n=27)				January 2007 workshop (n=112)			
	Initial		End workshop		Initial		End workshop	
	mean	sd	mean	sd	mean	sd	mean	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	3.81	.622	4.22	.424	3.98	.690	4.03	.592
2 My science content knowledge enables me to answer teachers' science questions effectively	3.44	.892	4.00	.620	3.33	1.021	3.63	.969
3 My knowledge of effective science teaching practices enables me to answer teachers' science pedagogy questions effectively	3.48	.802	4.19	.557	3.61	.876	4.03	.729
4 I am quite comfortable with having my professional learning workshops evaluated	4.19	.557	4.41	.501	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	3.96	.518	4.48	.580	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	3.67	.784	4.30	.609	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	3.11	.801	3.67	.832	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	3.70	.724	4.33	.555	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	3.96	.587	4.41	.572	3.94	.730	4.28	.557
Mean of individual means of self efficacy ratings (/5)	3.70		4.22		3.74		3.99	

Note. 5 = Strongly agree, 4 = Agree, 3 = Undecided, 2 = Disagree, 1 = Strongly disagree

Prior to the workshop the PLFs had lowest self-efficacy for giving advice to ECE teachers about science pedagogy (3.11/5) and this increased after the workshop (3.67/5), however, this remained the lowest aspect of self-efficacy for the group. The January 2007 PLFs and NSW PLFs also had lowest self-efficacy for this aspect of the PLF role. This is most likely a reflection of the PLFs being drawn from a primary rather than ECE background. Prior to the workshop the PLFs had highest self-efficacy for having their workshops evaluated (4.19/5).

After the workshop PLFs had highest self-efficacy for posing engaging tasks for teachers to work on in small groups (4.48/5), using facilitation tools and techniques (4.41), having workshops evaluated (4.41) and giving advice on integrating literacy and science education (4.33). The workshops gave the PLFs opportunities to work with a number of small group activities that they could use with teachers and were provided with the resources to conduct

these activities. These experiences had a positive impact on the PLFs' self-efficacy with posing engaging tasks for teachers.

The largest increase in self-efficacy was for answering teachers' science pedagogy questions effectively (3.48 to 4.19; 0.71) which is a reflection of the opportunities in the workshop to explore pedagogical issues such as investigating. The overall item mean for the nine-item scale increased from 3.70/5 to 4.22/5 after the workshop which is a larger gain in overall mean than for the January 2007 and NSW workshops.

Total scale scores were calculated for each PLF by summing their scores over the nine items giving a maximum possible score of 45. These scores are reported in Table 21.

Table 21: Frequency of total scale scores for self-efficacy as professional learning facilitators for surveys at beginning and end of the WA September 2007 workshop

Total scale score for self-efficacy as a PLF	Number of NSW PLFs (n=27)	
	Pre-workshop	Post-workshop
1-10	0	0
11-20	0	0
21-30	5	1
31-40	20	19
41-45	2	7
Mean self efficacy score for all facilitators /45	33.3**	38.0**
S.D.	3.742	3.293

Note. ** p<0.01

Mean total scale scores for the 27 PLFs who completed both pre- and post-workshop questionnaires increased from 33.3 to 38.0. A two-tailed paired t test indicates that the post workshop score is significantly higher than the pre workshop score (p<0.01). Of educational significance is the decrease in the number of PLFs with modest levels of self-efficacy (21-30/45) and the increase in the number with very high (41-45/45) levels of self-efficacy.

Confidence with facilitating workshops on aspects of science and literacy teaching
The PLFs responded to a seven-item scale which assessed their confidence with facilitating workshops on aspects of science and literacy teaching. PLFs responded on a five-point scale ranging from *No confidence* (1) to *Very confident* (5) and mean scores were calculated for each item. Pre- and post-workshop mean scores are reported in Table 22.

Table 22: Mean ratings of confidence with facilitating professional learning workshops on the following aspects of primary science and literacy teaching at the beginning and end of the workshop

Aspect of facilitating	Mean score (/5)							
	WA Sept 2007 workshop (n=27)				January 2007 workshop (n=112)			
	Initial		End workshop		Initial		End workshop	
	mean	sd	mean	sd	mean	sd	mean	sd
An introduction to *Primary Connections*	3.41	1.083	4.26	.594	3.23	1.152	4.22	.596
Coordinating the science programme in a primary school	3.56	1.121	4.44	.577	3.73	.914	4.18	.674
Assessment of learning in primary science	3.44	1.155	4.30	.609	3.30	1.080	4.25	.651
Conducting investigations in primary science	3.74	.944	4.48	.580	3.73	.934	4.22	.719
Cooperative learning strategies	4.00	.784	4.52	.509	4.06	.766	4.31	.672
Developing literacies needed for learning science	3.41	.888	4.22	.641	3.77	.891	4.13	.704
Using an inquiry model to plan primary science units of work	3.67	.920	4.22	.641	3.70	.969	4.02	.838
Mean of individual mean confidence scores (/5)	**3.60****		**4.35****		**3.65**		**4.19**	

Note. ** $p < 0.01$

Prior to the workshop the PLFs had least confidence in facilitating workshops on an introduction to *Primary Connections* (3.41/5) and developing literacies needed for learning science (3.41) and greatest confidence with facilitating workshops on co-operative learning strategies (4.00/5). After the workshop the PLFs had greatest confidence in facilitating workshops on cooperative learning (4.52/5) and conducting investigations (4.48).

The overall mean scores for the seven-item scale increased from 3.60/5 before the workshop to 4.35/5 after the workshop. A two-tailed paired t test indicates that the post mean score is significantly greater than the pre workshop mean score ($p < 0.01$). The increase in mean confidence for facilitation score for the WA group (0.75) was greater than the growth achieved at the NSW (0.68) and Canberra (0.54) workshops.

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	Thirty-four participants attended the workshop; of these only 26 completed both the initial and end of workshop questionnaires. Of the 33 who completed the initial questionnaire, 26 were from the Government, three from Catholic and one from Independent sectors. The participants were drawn from central and district offices (50%), primary schools (41%), secondary schools (6%) and from a professional association (3%). The high proportion of participants who were not based in schools (53%) without teaching commitments suggests that this cohort may have the flexibility to facilitate workshops across schools in a district.	Tables 1 and 2
2	The PLFs had a range of teacher education qualifications. About three-fifths had completed a four-year BEd, one-quarter had completed a postgraduate diploma and the remainder were three-year trained. Two of the PLFs had a masters degree. Sixty-one per cent had studied no science beyond Year 12 while 24% had a science major in their degree.	
3	Many of the participants were general education advisors or consultants while about one-third were classroom teachers whilst others had leadership responsibilities within their schools as science coordinators or deputy principals. None of the participants were *Primary Connections* trial teachers, however, almost 70% had taught with *Primary Investigations* and would have been familiar with the 5Es model and cooperative learning strategies. Approximately half of the participants had 10 years or less professional experience while 30% had more than 20 years experience. Eight participants had five or less years of experience.	Tables 3 and 4
4	All but one had facilitation experience and 48% had more than five days of facilitation experience. Almost half had primary science facilitation experience and many had facilitated professional learning in more than one learning area. Half of the January 2007 cohort of centrally trained PLFs and 28% of the NSW trained PLFs had more than five days of facilitation experience. The high level of facilitation experience for the Canberra and Perth cohorts is related to the high proportion of central and district office staff in these groups.	Tables 5 and 6
5	Most of the participants believed that the purpose of primary science teaching is to develop cognitive learning outcomes, about half mentioned affective outcomes while some (15%) mentioned scientific literacy.	Table 7
6	When asked about the characteristics of high quality science teaching, most responses related to characteristics of the teacher, pedagogy and curriculum. Participants believed that the teacher should be knowledgeable, skilful, enthusiastic and engaging, and that the pedagogy and curriculum should be hands-on, inquiry-based, relevant, integrated and include higher order thinking.	Table 8
7	The two most frequently mentioned aspects of science teaching that the participants believed need to be improved, were teacher knowledge and a more inquiry-oriented pedagogy. Integration of the curriculum, availability of resources and teacher confidence were also frequently mentioned. Teacher confidence and knowledge for teaching science were mentioned far more frequently (76%) by the January 2007 group of PLFs (Hackling, 2007).	Table 9

8	When asked about characteristics of quality literacy teaching, the most frequent responses related to explicit development of skills and relevance to the age and ability of the students. Literacy learning that is enjoyable and engaging, embedded in context with a variety of genres covered were also mentioned frequently.	Table 10
9	The most common suggestion (30%) for improving literacy teaching was to embed literacy learning in all learning areas; a view which is totally consistent with the *Primary Connections* approach of integrating science and literacy learning. Other improvements mentioned by participants included extending the range of genres (17%), explicit development of skills (17%) and the provision of current and relevant resources (17%), all of which are addressed by the *Primary Connections* programme.	Table 10
10	The participants believed that high quality teacher professional learning is characterised by active participation of teachers in the workshop, relevance of topic and engaging presentation. Following the workshop active participation, relevance of topic and credible and prepared presenters were the most frequently mentioned. Before the workshop, the participants were also asked what aspects of typical teacher professional learning need to be improved. Engaging presentation (34%), relevance of topic (31%) and active participation of teachers (24%) were key issues for the PLFs.	Table 11
11	The most frequently mentioned potential barriers to uptake of *Primary Connections* were money/resources, access to professional learning, time for professional learning, availability of teacher relief and support from administration. It is interesting to note that availability of *Primary Connections* units, which has been a concern for some PLFs in previous workshops, was mentioned by only two participants.	Table 12
12	Prior to the workshop, the participants were also asked what factors were likely to limit their effectiveness as PLFs. The most frequently mentioned factors were: understanding of science and *Primary Connections* which is not surprising since none of the PLFs were trial teachers; time and support from administration which are related as the support of the line manager is needed to give facilitation a priority within their workloads; awareness and promotion of their role and availability; and, resources.	Table 13
13	Most of the participants' responses to a question about their goals for the workshop related to personal concerns of learning how to facilitate *Primary Connections* workshops, to find out about the programme and to improve their own teaching. It should be noted that none of the participants were trial teachers with a good working knowledge of *Primary Connections*. Other had concerns about helping colleagues improve their science teaching or helping to implement the programme across the system.	Table 14
14	The PLFs gave positive responses about their achievement of the aims for the workshop. More than 90% of the PLFs indicated they had achieved three of the five aims *To a large extent* or *Quite a lot*. The PLFs were a little less positive about their skills and confidence for facilitation (81% in top two categories) and their understanding of principles of effective professional learning (85%). Levels of achievement of workshop aims were very similar as those attained for the January 2007 group.	Table 15

15	A large majority of the PLFs (92%) indicated that they were *Very well prepared* or *Well prepared* for their facilitation role (Table 16) which was a more positive outcome than for the NSW PLF workshop (87%) and the January 2007 group (84%).	Table 16
	Two-thirds of the PLFs indicated that no changes were needed to improve the workshop. Three PLF suggested the workshop could be extended by a day and two would have liked more time to work through the folder.	
16	When asked what further support they would need, the most common responses related to ongoing support from the Academy of Science, updates on resources and contact with other PLFs. Some (5 PLFs) thought that they needed to teach with *Primary Connections* themselves before facilitating workshops.	Table 17
17	The PLFs gave a very positive evaluation of the professional learning resources with all indicating they were excellent or good. When asked to comment on the resources, the most frequent comments were excellent (91%), well set out (35%) and comprehensive (26%). One PLF would have liked the resources to be linked to outcomes for WA and one would have liked more workshop topics included.	Table 18
18	The PLFs had a reasonable level of confidence with their own science teaching, above the rating *OK* (3/5) and close to the rating *Confident* (4/5) but well below the rating *Very confident* (5/5), however, there was considerable variation within the group as indicated by the large standard deviations. The overall mean for all items in the scale (3.70/5) was lower than the overall mean for the January 2007 group (3.82/5).	Table 19
	The PLFs were most confident with managing hands-on group activities (4.04/5) and engaging students' interest in science (4.00). They were least confident with explaining science concepts (3.44) and assessing children's learning in science (3.52).	
19	The PLFs self-efficacy as professional learning facilitators increased significantly over the workshop. The overall item mean for the nine-item scale increased from 3.70/5 to 4.22/5 after the workshop which is a larger gain in overall mean than for the January 2007 and NSW workshops.	Table 20
	Prior to the workshop the PLFs had lowest self-efficacy for giving advice to ECE teachers about science pedagogy (3.11/5) and this increased after the workshop (3.67/5), however, this remained the lowest aspect of self-efficacy for the group. The January 2007 PLFs and NSW PLFs also had lowest self-efficacy for this aspect of the PLF role. This is most likely a reflection of the PLFs being drawn from a primary rather than ECE background. Prior to the workshop the PLFs had highest self-efficacy for having their workshops evaluated (4.19/5). After the workshop PLFs had highest self-efficacy for posing engaging tasks for teachers to work on in small groups (4.48/5), using facilitation tools and techniques (4.41), having workshops evaluated (4.41) and giving advice on integrating literacy and science education (4.33). The workshops gave the PLFs opportunities to work with a number of small group activities that they could use with teachers and were provided with the resources to conduct these activities. These experiences had a positive impact on the PLFs' self-efficacy with posing engaging tasks for teachers.	
	Of educational significance is the decrease in the number of PLFs with modest levels of self-efficacy (scale scores of 21-30/45) and the increase in the number with very high (41-45/45) levels of self-efficacy.	

| 20 | The PLFs confidence with facilitating professional learning workshops on aspects of science and literacy teaching increased significantly over the workshop. The increase in mean confidence for facilitation score for the WA group (0.75) was greater than the growth achieved at the NSW (0.68) and Canberra (0.54) workshops.
Prior to the workshop the PLFs had least confidence in facilitating workshops on an introduction to *Primary Connections* (3.41/5) and developing literacies needed for learning science (3.41) and greatest confidence with facilitating workshops on co-operative learning strategies (4.00/5). After the workshop the PLFs had greatest confidence in facilitating workshops on cooperative learning (4.52/5) and conducting investigations (4.48). | Table 21 |

Discussion and Conclusions

The workshop attracted a sample of participants, of whom, half were based in schools as classroom teachers, science co-ordinators or deputy principals, and half were based in central or district offices as education advisors or consultants (Key Findings 1 and 3). Given that only one-third of the PLFs were classroom teachers it is likely many of the PLFs will have the flexibility within their professional roles to facilitate professional learning within their districts. Although a majority of the PLFs had no science studies beyond Year 12, one-quarter had a science major in their undergraduate studies (KF2). Eight participants had five or less years teaching experience while one-third had 20 or more years of experience. The group was diverse in background. All but one had professional learning facilitation experience and half of the group had five or more days of facilitation experience (KF4), far more than the NSW cohort (Hackling, 2008) which can be attributed to the higher proportion of education advisors in the WA group.

Prior to the workshop the group had a reasonable but not high mean score for confidence with their own science teaching; a level of confidence that was lower than that of the January 2007 group of PLFs (KF18). There was considerable variation in the backgrounds of the participants as indicated by the high standard deviations for key variables, however, the majority of the group had appropriate background and experience to benefit from the PLF training.

The participants' beliefs about the purpose of primary science teaching, the characteristics of effective science teaching and beliefs about effective teacher professional learning were broadly consistent with the research literature (e.g. Goodrum, Hackling & Rennie, 2001; Senate Inquiry, 1998) and with the focus of the *Primary Connections* project (KFs5-10). The PLFs' beliefs about improving literacy teaching were particularly consistent with the *Primary Connections* approach: embedding literacy teaching into all learning areas; extending the range of genres; explicit development of skills; and, the provision of current and relevant resources (KF9).

The participants' goals for attending the workshop were strongly related to their personal needs of learning how to facilitate *Primary Connections* professional learning, learning about *Primary Connections* and improving their own teaching (KF13). Prior to the workshop, most of the participants' concerns appeared to be related to the informational, personal and management stages of concern from the Concerns-Based Adoption Model of Hall and Hord (1987) rather than having concerns about system-wide implementation of the programme.

The main factors, identified by the PLFs, likely to act as barriers to the uptake of *Primary Connections* were: money/resources, access/time for professional learning, availability of teacher relief and support from administration (KF11). Only two PLFs mentioned limited availability of curriculum units which can be attributed to WA DET having provided curriculum units to all government primary schools and the increased range of units available from the Academy of Science. Prior to the workshop, they expected that their own understanding of the programme and the support of line managers were possible limitations on their own effectiveness as facilitators (KF12). It should be noted that none of this WA cohort were *Primary Connections* trial teachers as most had been previously trained as facilitators. However, it should be noted, that after the workshop, all indicated that they understood the *Primary Connections* project, the teaching and learning model and curriculum resources *To a large extent* or *Quite a lot* (Table 15).

The workshop had very positive impacts on the participants' self-efficacy for facilitation and confidence for facilitating *Primary Connections* workshops. The PLFs' self-efficacy as professional learning facilitators increased significantly over the workshop (KF19). The

increase in self-efficacy was greater than for the January 2007 and July NSW workshops. There was a decrease in the number of PLFs with modest levels of self-efficacy and an increase in the number with very high levels of self-efficacy (KF19). After the workshop, the PLFs had high self-efficacy for posing engaging tasks for teachers to work on and for using facilitation tools and techniques. This can be attributed to opportunities to try out the activities they would use in their own workshops, being provided with the resources for these activities, and having the use of facilitation tools and techniques modelled for them in the workshop. After the workshop, the lowest mean item score was 4.22/5 which is between the scores for *Confident* (4/5) and *Very confident* (5/5) which indicates the high level of confidence for facilitating the full range of *Primary Connections* workshops (Table 21).

Given the strong growth in self-efficacy and confidence it is not surprising that the workshop was evaluated very positively by the PLFs with large majorities indicating they had achieved the aims for the workshop and that they were very well prepared for their role as a PLF (KFs 14 and 15). Five of the PLFs indicated that they would have liked more than the three days of the workshop. Given that none of the PLFs were trial teachers they would have had limited prior knowledge of the programme.

The professional learning resources were also rated very positively and feedback suggests no obvious areas in need of improvement (KF17). One PLF would have liked the resources to be linked to the WA learning outcomes and one would have liked a wider range of workshop topics.

In terms of their ongoing needs for support, the PLFs most frequently mentioned the support of the Academy team, updates of resources and contact with other PLFs (KF16). This highlights the importance of the aim for the workshop of building networks between the PLFs themselves and with the Academy team who will provide ongoing support.

Given the quality of the workshop and resources, and the richness of the professional learning that occurred for the PLFs, it is likely that they will be effective as facilitators and leaders within their own schools. There would be value in providing a follow-up workshop to provide an opportunity to ascertain the extent to which they are successful as facilitators and to give them further support and update them on new resources.

Although not explicitly evaluated, it is likely that there are important benefits from conducting PLF training within jurisdictions. It provides an increased opportunity for jurisdictional ownership over the training of the PLFs, for the workshops to be tailored to the specific contexts and policy settings of the jurisdiction and for the local science policy officer to have significant input to the programme. Building jurisdictional workshops on the expertise and models developed nationally by the Australian Academy of Science ensures quality, and tailoring workshops to local contexts ensures relevance and ownership. These are important benefits of the national collaborative approach advocated by Goodrum et al. (2001) for the improvement of science education in Australian schools.

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Primary Connections
Linking science with literacy

PROFESSIONAL LEARNING FACILITATOR 3 DAY WORKSHOP
WA DET, 10-12 SEPTEMBER 2008

DAY 1: Monday 10 September

5Es PHASE	FOCUS
INTRO **(30mins)** 9.00-9.30	Introductions, Acknowledgement of Noongar Land • Purpose (L) • Parking lot (L) • Outline (R) • Folder (R) • Learning Pyramid(R) • Participant expectations (L)
ENGAGE **(75mins)** 9.30-10.45	**Beliefs, concerns & scientific literacy** **What is *Primary Connections?*** "The Bridge" **Broad purpose of *Primary Connections*- Scientific literacy** **Setting the Scene:** Individual navigation using checklist Orientation to exemplary curriculum units, science b'ground CD, website
MORNING TEA **(30mins)** 10.45-11.15	
EXPLORE **(345mins total)** 11.15-11.45 11.45-1.30	**Cooperative learning** (30mins) DVD **5Es** (105mins) Engaging students and eliciting prior knowledge Building an understanding of the focus of each phase Behaviours of teachers and students at each phase Reflecting on the 5Es
LUNCH **(30mins)** 1.30-2.00	Give out sets of curriculum units
EXPLORE 2.00-3.15	**Investigating** (75mins) Why do investigations? A short investigation Writing questions for investigation DVD
CONCLUSION **DAY 1** 3.15-3.45	Summary Reflections Questions

Day 2 Tuesday 11 September

EXPLORE 9.00 – 9.20 9.20 -10.45	Parking Lot questions/issues **Linking science with literacy** (85mins) Confusion between terms Producing a literacy product Literacy focuses Exploring advertisements-critical literacy exercise Summary
MORNING TEA (30mins) 10.45-11.15	
EXPLORE 11.15-12.30 **EXPLAIN (60mins)** 12.30-1.30	**Assessment** for and of learning (75mins) Curriculum Unit plan and organisation (20mins) Essence of curriculum units (40mins)
LUNCH (30mins) 1.30-2.00	
EXPLAIN 2.00-3.00 **CONCLUSION DAY 2** 3.00-3.45	**Origin, stages, strands, outcome levels** **Research report** **Indigenous Perspective** **Summary** **Reflection**

Day 3: Wednesday 12 September

ELABORATE (120 mins) 9.00-10.15	**Unit planning** • Backward design • Choose an outcome • Brainstorm materials, properties (abs), variables • Investigating planner St 2 • Do investigation • Review investigation • Plan rest of unit
10.15-11.00	**Science content:** How can I find out? o Background CD o PC Units: TBI o Syllabus documents **Take an outcome and apply it**
MORNING TEA (30mins) 11.00-11.30	
IMPLEMENTING *PRIMARY CONNECTIONS* (75mins) 11.30-12.45	Planning time for WA DET Julie Belohlawek
LUNCH (45mins) 12.45-1.15	
ELABORATE continued (120mins total) 1.15-1.45	Being a curriculum leader OZ model of leadership (30mins)
1.45- 2.00	Introduction to the Workshop modules
2.00-3.15	Groups develop and practice a workshop component to present to the group
EVALUATE & CONCLUSION (30mins) 3.15-4.00	Post questionnaire Revisit expectations Correlation chart (reflection) Questions Certificates

Appendix 2: Initial questionnaire

Australian Academy of Science: *Primary Connections* Programme
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 programme 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* Programme
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 programme 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