Teaching neonatal skills in South Africa

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INTRODUCTION

At the WONCA Conference in Santiago de Compostela, Spain in September 2003 Professor Ian Couper (Professor of Rural Health, Witswaterand University, Johannesburg, South Africa) mentioned to Dr Jane Greacen (CEO Rural Workforce Agency, Victoria [RWAV]) that he felt that Neonatal Resuscitation skills could be improved in the rural areas of South Africa and the neonatal mortality/morbidity would be improved. Jane suggested that Jim Thurley would be a suitable person to do the training Jim’s background is in Paediatrics and from 1990 to 2000 he had been the Remote Paediatrician in Central Australia. Jim also has experience in teaching.

Jane and Jim approached Ms Kim Goodluck (CEO Northern Territory Remote Workforce Agency [NTRHWA]) to see if she was in agreeance that Jim go to South Africa for a period of three months to set up the program. She agreed to pay Jim’s wages for the period and Jane agreed that RWAV would cover expenses for the travel to and from South Africa. Ian agreed that the Department of Family Medicine would be responsible for the period that Jim was in South Africa, arranging travel and accommodation in the various provinces.

After Ms Kathy Bell the new CEO of NTRHWA joined the organisation in February 2004, she agreed to support the project on the basis under the terms of the Melbourne Manifesto that this would give something back to South Africa for the number of doctors that Australia had recruited from that area.

During the following months various teleconferences were held between Ian in South Africa and the two agencies in Australia and the program was planned to start in South Africa in July 2004, to coincide with the Southern African Resuscitation Society’s Annual Scientific Update.

During Jim’s time in South Africa the NTRHWA became the General Practice Primary Health Care Northern Territory (GPPHCNT).

From the Perinatal Problem Identification Program run in South Africa the neonatal death rate for South Africa is 14.5/1000 live birth in the cities and 11.3/1000 live births in the rural areas, with birth asphyxia accounting for 6.92/1000 in the rural group and 6.21/1000 in the cities. During his time in South Africa Jim was told that 25% of all neonatal deaths were influenced by “inappropriate actions” by health care workers. This indicated that effective education on neonatal resuscitation for health care workers had real potential to save babies lives.

THE DEVELOPMENT OF THE PROGRAM

It was agreed that the program should have two components;

- a Neonatal Resuscitation Program
- a Train the Trainer Program.
It was also agreed that there was no suitable Neonatal Resuscitation Program available, so Jim agreed to write a suitable program. This was done with the help of Dr Srinivas Bolisetty, Neonatologist, Royal Hospital for Women, Randwich, New South Wales, Australia and some advice from Dr Gavin Wheaton, Paediatrician, Women and Children’s Hospital, North Adelaide, South Australia.

The pre-course reading was to be the South African Neonatal Resuscitation Manual

- a pre course multiple choice question (MCQ) paper
- a series of lecture presentations
- several skill stations
- scenarios
- a post course MCQ paper.

During the time in South Africa a Pre and Post course skill station test was added.

Most participants filled out a post course evaluation form.

The course was sent to the Southern African Resuscitation Society and the South African Paediatric Association for their approval. It was accredited by the Paediatric Association, allowing Doctors to receive CME points.

RWAV had developed a Train the Trainer Manual for General Practitioners training other General Practitioners, written by Dr Debra Nestel, Senior Lecturer, Centre for Medical and Health Sciences Education, Monash University, Melbourne, Victoria.

Jim went to Melbourne to attend the pilot course run by Ms Nestel to equip him with the skills required to Train Trainers.

The Neonatal Resuscitation Train the Trainer course was developed using elements of the Manual compiled by Ms Nestel and lectures prepared by Dr David Campbell, rural doctor and Director, East Gippsland Rural Clinical School, Monash University.

Jim then developed further elements of the course.

The Train the Trainer course consisted of:

- the principles of adult learning
- a series of presentations on how to teach skill stations and scenarios
- how to give a lecture
- practice teaching skill stations and scenarios
- a practice lecture
- how to conduct small group training.

Most participants completed, following the course, an evaluation form.
THE NEONATAL RESUSCITATION PROGRAM – EVALUATION

The participants

There were 37 courses held in 28 different sites. A total of 415 people were trained in courses run by me. There were 293 females and 122 males. 215 of the people were nurses; 192 were doctors, 8 paramedics and 3 medical students took part as observers.

These statistics are summarised in the following table.

<table>
<thead>
<tr>
<th>Province</th>
<th>Sites</th>
<th>Courses</th>
<th>Male</th>
<th>Female</th>
<th>Nurses</th>
<th>Doctors</th>
<th>Paramedics</th>
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<td>17</td>
<td>59</td>
<td>41</td>
<td>35</td>
<td>0</td>
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<tr>
<td>Gauteng</td>
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<td>5</td>
<td>20</td>
<td>10</td>
<td>15</td>
<td>0</td>
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<tr>
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<td>4</td>
<td>14</td>
<td>29</td>
<td>20</td>
<td>23</td>
<td>0</td>
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<tr>
<td>Limpopo</td>
<td>5</td>
<td>6</td>
<td>22</td>
<td>43</td>
<td>28</td>
<td>33</td>
<td>4</td>
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<td>36</td>
<td>31</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>Kwazulunatal</td>
<td>5</td>
<td>7</td>
<td>20</td>
<td>51</td>
<td>43</td>
<td>24</td>
<td>4</td>
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<td>19</td>
<td>20</td>
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<td>13</td>
<td>35</td>
<td>26</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>Totals</td>
<td>28</td>
<td>37</td>
<td>122</td>
<td>293</td>
<td>215</td>
<td>192</td>
<td>8</td>
</tr>
</tbody>
</table>

All the nursing staff were trained in South Africa. All the paramedics were trained in South African. Table 2 shows the countries where doctors obtained their primary degree.

<table>
<thead>
<tr>
<th>Country</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Republic of South Africa</td>
<td>119</td>
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<tr>
<td>Cuba</td>
<td>16</td>
</tr>
<tr>
<td>Nigeria</td>
<td>9</td>
</tr>
<tr>
<td>Democratic Republic of the Congo</td>
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<tr>
<td>Uganda</td>
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<tr>
<td>India</td>
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</tr>
<tr>
<td>Zimbabwe</td>
<td>4</td>
</tr>
<tr>
<td>Bangladesh</td>
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</tr>
<tr>
<td>United Kingdom</td>
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</tr>
<tr>
<td>Burma</td>
<td>2</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>2</td>
</tr>
<tr>
<td>Romania</td>
<td>2</td>
</tr>
<tr>
<td>Kenya</td>
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</tr>
<tr>
<td>Argentina</td>
<td>1</td>
</tr>
<tr>
<td>Germany</td>
<td>1</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>1</td>
</tr>
<tr>
<td>Nepal</td>
<td>1</td>
</tr>
<tr>
<td>China</td>
<td>1</td>
</tr>
<tr>
<td>Poland</td>
<td>1</td>
</tr>
<tr>
<td>Egypt</td>
<td>1</td>
</tr>
<tr>
<td>Hungary</td>
<td>1</td>
</tr>
<tr>
<td>United States of America</td>
<td>1</td>
</tr>
<tr>
<td>Russia</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>192</td>
</tr>
</tbody>
</table>
All participants were given an evaluation form except for one course in Kwazulunatal. Most participants filled out at least part of the form. The responses were anonymous. Each section also allowed for written comments.

The evaluation form asked the participants to score each session out of 5:

5 = Excellent
4 = Very Good
3 = Good
2 = Fair
1 = Poor

The results from the evaluation form were as follows.

1. General course satisfaction

Score 5 = 193
Score 4 = 189
Score 3 = 20
Score 2 = 1
Score 1 = 0

The evaluation form also asked the Question Were you satisfied with the course Y/N

All those who answered the question, even the person who rated the course 2, ringed Y.

2. Evaluation of the lecturing

The scores for the standard of lecturing was
Score 5 = 919
Score 4 = 835
Score 3 = 168
Score 2 = 12
Score 1 = 1*

* Although I recorded this as a 1, in reality that lecture was not given due to time constraints

**Figure 2** Evaluation of the lectures

3. Was there too much lecturing?

Yes = 46
No = 340
4. Evaluation of the skills stations

*All skill stations combined*

The skill stations were also scored from 5-1

5 = 437  
4 = 279  
3 = 63  
2 = 10  
1 = 0
5. Evaluation of the scenarios

Because of the time factor, scenarios were not done at all the courses. They were also scored from 5–1

5 = 53
4 = 92
3 = 11
2 = 2
1 = 0
6. Confidence in resuscitation

The last question on the evaluation form was: Do you feel more confident in Resuscitation?

There were:
Yes = 386
No = 7
This represents 92% of all people who did the course and 98% of people who answered the question. The people, who answered no, often added a rider saying that more practice was needed. One answered, “No, I’m a Consultant Paediatrician.”

7. Pre- and post-tests

Most participants completed the pre and post MCQ test. The exception was one course in Kwazulunatal where no one completed the post-test and another four people left before the end of their course. Three people did not do the pre test, because of their extreme late arrival.

The Bag and Mask Skill Station pre and post-test was introduced in Kwazulunatal at the suggestion of Professor Steve Reid. It was included in most courses following its introduction there.

399 candidates completed both the pre and post test MCQs.

The pre course average was 57.21% with a range of 20% to 88.6% and the post course average was 67.79% with a range 30% to 97.5%.

The range of difference between the pre and post course test was -22.5% to +55%

Figure 7  A typical graph showing pre- and post-test MCQ results
As a general rule, Medical Officers scored higher than the Nursing Staff.

58 candidates took the pre and post Bag and Mask test in Kwazulunatal and 64 candidates in the Eastern and Western Cape. The maximum score was 10.

In Kwazulunatal the pre course average was 2.72 with a range of 0 to 10. The post-test average was 8.89 with a range of 6 to 10.

In the two Cape Provinces 64 people took both the pre and post test with a pre test average of 3.42 and a range of 0 to 7.5 with a post test average of 8.97 with a range of 5 to 10.

Below are two graphs of typical scores for the Bag and Mask Tests.
For the candidates with no black line it indicates that they scored 0 in the pre course test.

This was a very useful addition to the course as the local trainers were able to see exactly what skills were lacking in the staff that they had to work with.
THE TRAIN THE TRAINER COURSES

Participants

Twelve Train the Trainer Courses were held, training 97 people. This is summarised in the following table.

Table 3 Summary of Train the Trainer Courses: places and people

<table>
<thead>
<tr>
<th>Province</th>
<th>Sites</th>
<th>Courses</th>
<th>Candidates</th>
<th>Midwives</th>
<th>Doctors</th>
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<tr>
<td>NW Province</td>
<td>1</td>
<td>3</td>
<td>12</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Gautang</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>1</td>
<td>1</td>
<td>9</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Limpopo</td>
<td>1</td>
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<td>12</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Free State</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Eastern Cape</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Western Cape</td>
<td>1</td>
<td>1</td>
<td>12</td>
<td>3</td>
<td>9</td>
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<tr>
<td>Kwazulunatal</td>
<td>2</td>
<td>2</td>
<td>29</td>
<td>17</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>9</td>
<td>12</td>
<td>97</td>
<td>30</td>
<td>67</td>
</tr>
</tbody>
</table>

EVALUATION OF THE TRAIN THE TRAINER COURSE

After the course all the participants were asked to fill out an evaluation form.

The satisfaction of the day was rated as follows:

4 = Very Satisfied
3 = Moderately Satisfied
2 = Slightly Satisfied
1 = Not at all Satisfied

The results were:

4 = 86
3 = 10
2 = 0
1 = 0
Each of the other parts of the course was scored as per the NN Course.

5 = Excellent
4 = Very good
3 = Good
2 = Fair
1 = Poor

1. Evaluation of adult learning principles

5 = 39
4 = 46
3 = 9
2 = 1
1 = 0
2. Lecture on teaching skill stations

The lecture on how to teach skill stations scores were as follows.

5 = 53
4 = 37
3 = 5
2 = 0
1 = 0
3. Evaluation of lecture on teaching scenarios

The response to the lecture on teaching scenarios was:

5 = 47
4 = 42
3 = 5
2 = 0
1 = 0
4. Evaluation of lecture on how to lecture

The scores given for the lecture on lecturing were:

5 = 36
4 = 39
3 = 12
2 = 1
1 = 0
5. Evaluation of how to work in small groups

The lecture on how to deal with small groups was scored as following:

5 = 25
4 = 18
3 = 2
2 = 0
1 = 0

This was not presented at all courses.
6. Evaluation of practising skill stations

Evaluation of practising skill stations:

5 = 49  
4 = 38  
3 = 8  
2 = 0  
1 = 0
7. Evaluation of practising scenarios

5 = 38  
4 = 31  
3 = 3  
2 = 0  
1 = 0

Figure 18  Evaluation of practising scenarios

8. Evaluation of the practical on small group work

5 = 23  
4 = 16  
3 = 3  
2 = 0  
1 = 0

This session was not held with all groups.
None of the groups gave a practice lecture, so there was no evaluation of this session.

**PROBLEMS WITH THE NEONATAL RESUSCITATION PROGRAM**

**The schedule**

The schedule was punishing and arduous and at times over-ambitious. In Limpopo Province, Anne Robertson, one of the local Paediatricians, intervened and made some changes after an in depth discussion with all the local trainers taking part in the Train the Trainer Course. Without this intervention Limpopo would have been extremely over ambitious.

One of the problems was that none of the provinces talked to each other, so that when Jim arrived in a new province they had no idea of what he had done the week before and no idea of what he was going to do when he left their province. This lead to courses being arranged for the weekend in one province and starting the Monday when Jim arrived in the next province. The heavy schedule also meant that there was a lot of driving at night.

Night driving on open roads is something that Jim tries to avoid in Australia because of the danger of collisions with animals. Jim did more night driving in the three months in South Africa than he had done in more than thirty years of living in Australia. Luckily, most of the people who drove were competent drivers. However during one drive the driver said, “As its dark I won’t drive fast.” This was said as the speedometer reached 160 kilometres an hour. He then proceeded to tell Jim that one of his friends had recently died on this road after he hit a Rhino! That did nothing to alleviate Jim’s fears.

Jim was glad that he had made it clear that he could not drive. To have tried to do the schedule, with out been driven would have been impossible. Also Jim would not have known the way on several occasions and it would have been dangerous driving in some of the areas he went to, without a local in the car.

One of the examples of the problems that having each individual province doing the planning in isolation. While in Mpumalanga Province Jim did a course in Nelspruit. After the course he was driven all the way back through the province, nearly to Pretoria. The next week, he had to
do a course near Hazyview in Limpopo, only 60 kilometres or so from Nelspruit. Jim had travelled several hundreds of kilometres to be back in the same vicinity.

This heavy schedule and the fact that each course generated over three hours computer work, meant that the free time Jim had was very limited.

When it was agreed by Kim Goodluck and later with Kathy Bell, that Jim would spend three months in South Africa, one of the conditions was that he would be available to do work for the organisation that he worked for. This meant that he often had to get up at about 0400 hours to be able to be in contact with the two offices in Alice Springs and Darwin in the Northern Territory. This was the only time that was suitable because of the travelling and courses as the Northern Territory is seven and a half hours a head of South Africa

**The booklets**

The Southern African Resuscitation Society’s Manual was the agreed pre-course reading. It was very frustrating that the booklets were not given to many of the participants until they arrived at the course. Very few people had had the booklet long enough to have had time to read them. Jim is of the opinion that this lowered the level of knowledge of some people at the end of the course.

**Time keeping**

The starting time for the courses was usually 0800 or 0830 hours. At many of the courses several of the participants were late and many of the courses did not start until 1030 hours, or later. This was extremely frustrating as it meant that part of the proposed course had to be omitted. Some of the people who were doing the course were over three hours late. Jim appreciated that they had to come long distances and that there were often problems with hospital transport. At times Jim would have liked to have said, “Sorry, you’re too late.” but he felt that it was not his prerogative to do that. It may be that the local Family Medicine co-ordinator should do this. “African time,” became an excuse.

There were many classes that started on time, or close to the original starting time, but the stand out course was the one at Klerksdorp, where Jim was the last to arrive with the person who picked him up from the local motel taking him to where the course was being held. He arrived to a welcoming cup of coffee and biscuits and a few minutes after eight the course began.

**Interruptions**

Mobile phones were a constant problem, despite requests for them to be turned off. Again it was difficult for an outsider to know if the people who kept them on, really needed them to be contacted in an emergency. The Family Medicine co-ordinator needs to take responsibility for the people who really need to have constant mobile phone access. Several of the courses where also disrupted by participants walking in and out of the course.

**Equipment and venues**

Lack of appropriate equipment, especially Mannequins, was a problem in some places. This meant the course was difficult to run smoothly, but more importantly for the places that had no local mannequins have no means to continue training or for course participants to continue to practice what they learnt.
Other equipment was also lacking, especially appropriate laryngoscope blades and inferior bag and mask resuscitation equipment. Jim believes the course taught best practice, but the lack of appropriate equipment meant that participants were unable to perform what they had been taught because of poor quality equipment at their place of work. This lack of equipment and poor quality equipment is an impediment to improving outcomes and having less numbers of asphyxiated babies. Several of the venues were very inadequate for the number of people to be trained.

The use of Sampson Masks needs to be phased out as soon as possible as mentioned in the Resuscitation Handbook, because they are difficult to use and give inferior resuscitation.

**Numbers of participants on the courses**

The numbers who turned up to take the courses were a problem, especially the first course in each Province, where Jim was the only trainer at most places there were twelve people on the first course but at one venue there was seventeen. It meant that it was very difficult to do the skill stations properly if every one took part in performing the skills, it was very time consuming and other parts of the course had to be omitted, if the course was to finish at a reasonable time. Even the courses run with local trainers had too many participants in some cases for the number of trainers.

The number of participants put even more strain in the places where the equipment was lacking.

**Hospitality**

The hospitality that Jim received in South Africa was in the main wonderful and he thanks all the people who looked after him so well. There were times when he felt lonely, none more so than in the Eastern Cape. The time in the Eastern Cape was difficult. After the first days course Jim was taken to his hotel. After checking in he approached the security guard at the hotel and asked where he could buy some toiletries. The guard shook his head and said that he would have to buy what was needed. Jim felt like a prisoner in the hotel for the whole of his stay there.

Hearing gunshots and police sirens on the third night there did not make him feel any more comfortable.

**Trainers**

Most of the trainers selected by the various Provinces were more than adequate. However some were very inexperienced and there is doubt that they will be able to successfully run a course on their own. They were certainly keen, but it takes more than one Train the Trainer Course to be able to run the Neonatal course without any previous teaching experience. This is an area that the Family Medicine co-ordinators need to keep an eye on.

Most of the courses I conducted with the local trainers were well run and followed the format of the course as it had been written. However one course the lecturers were under prepared with the material in the course. They allowed the participants to leave before the end of the course and not complete all modules and skill stations.
**Emails**

Part of the agreement between Kathy and Jim to allow him to spend three months in South Africa was that there was regular contact through email. This was not always possible for a variety of reasons. Often the accommodation had no facilities and also some of the course venues also had no access. It was often several days before email contact could be arranged. This was extremely frustrating to members of staff in the Northern Territory.

**Evaluation**

The program needs to be evaluated. The evaluation needs to include:

- Have the participants maintained and used the skills they have learnt?
- Has the standards of the courses been maintained?
- Has it made a difference to Neonatal mortality and morbidity with a fall in asphyxiated babies?

There may be other aspects of the program that needs evaluation. This paper is not going to go further into the evaluation. Professor Ian Couper, Professor Jannie Hugo and Jim Thurley are working on the evaluation process.

**SUCESSES OF THE NEONATAL RESUSCITATION PROGRAM**

**Introduction**

The major success of the program was the number of people who were trained and the number of people who were trained to be trainers.

**Schedule**

Although mentioned in the problems section because of its intensity, the schedule was also one of the successes as it was extremely well organised. Jim was dropped off and picked up exactly as planned, with out any major hitches. He was met at all the airports and in the main was taken safely from place to place. Accommodation was always arranged. Any out of pocket expenses were quickly reimbursed by the Family Medicine Program. The smoothness of the travel and accommodation is a credit to the organisers in each Province and in Jannie and Ian’s offices.

**Hospitality**

Although it was mentioned in the problems Jim wants to stress again that in the main the hospitality he received was exceptional. He was taken into peoples homes and where possible entertained well.

The visit to Kruger National Park was a highlight, as was the rugby international between South Africa and New Zealand.

Being able to visit Robben Island left a deep impression on Jim.
THE FUTURE

RWAV and GPPHCNT are in the process of getting the Neonatal Resuscitation Course accredited by both the Australian College for Rural and Remote Medicine and the Royal Australian College of General Practitioners. This will allow it to run by General Practitioners for CME points for General Practitioners. Jim is also approaching the Australian College of Physicians (Paediatric branch) about the possibility of them also accrediting the course.

The project in South Africa was a good example of agencies in Australia working together and also working closely with another country. The project also showed that Family Physicians could be trained to present the course, negating the need to have specialists involved, thus keeping the cost of running the course to a minimum.

There is now a course in place to provide Neonatal Resuscitation training within Australia. Jim and the two Rural Workforce Agencies are in the position of being able to offer this course with in Australia, both to train in Neonatal Resuscitation and to train others to run the courses.

Jim has approached other Medical Educators and would be happy to liaise with any overseas country that sees the need for this type of training and take it to that country.

PRESENTER

Jim Thurley trained in England before migrating to Australia in 1974. Initially he did short-term GP locums before going to work as the Flying Doctor in Kalgoorlie. While working in Kalgoorlie he became interested in Paediatrics and worked at the Children’s Hospital in Perth, Western Australia. From there he moved to Alice Springs, initially working in the Paediatric Department in the hospital there. He then worked as the Remote Paediatrician in Alice Springs area for 12 years, before becoming the Medical Advisor for General Practice Primary Health Care, Northern Territory. He has always enjoyed teaching.