STUDENTS' UPTAKE OF PHYSICS: A STUDY OF SOUTH AUSTRALIAN AND FILIPINO PHYSICS STUDENTS

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in the

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Appendix

Appendix A

The Students' Uptake of Physics Study Questionnaire (South Australia version) and Codebook

THE UNIVERSITY OF ADELAIDE
AUSTRALIA

SUB CRUCE LUMEN

SCHOOL OF EDUCATION

STUDENTS' UPTAKE OF PHYSICS
STUDY QUESTIONNAIRE

(For students in South Australian schools)

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Students' Uptake of Physics STUDY QUESTIONNAIRE

In this booklet you will find:

- *General Information* items
- Items about *Motivation*
- Items about *Self-esteem*
- Items about *Classroom Climate*
- Items about *Attitudes Toward Physics*
- Items about *Parents' Aspirations*
- Items about *Computer Use and Access*

Please read each question carefully and answer as accurately as you can. For this questionnaire, you will answer in several ways – by <ticking> a box, marking a box with an "X", or writing down a number that corresponds to your answer for a particular question/item. For a few questions you will need to write a short answer.

If you make a mistake in your answer, simply cross out (or shade the whole box) your error and mark the correct answer. If you make an error when writing an answer, simply cross it out and write the correct answer next to it.

In this questionnaire, there are no "right" or "wrong" answers. Your answers should be the ones that you think are "right" for you.

You may ask for help if you do not understand something or are not sure how to answer a question. General information about your school will be provided for you to be able to answer some of the items that pertain to your school.

Your answers will be combined with others to make totals and averages in which no individual can be identified. <u>All your answers and your identity will be kept strictly confidential</u>.

Your cooperation is greatly appreciated.

Thank you.

Student I.D.: _____

Student Name: _____

School Name: _____

Schooling Level:

- ☐ Year 11 High School
- ☐ Year 12 High School
- ☐ First Year University

Please proceed to the next page

Section 1: GENERAL INFORMATION ABOUT YOU AND YOUR FAMILY, YOUR SCHOOL, AND YOUR PERCEPTIONS OF PHYSICS

1.1 You and your family

For each item, please circle the most appropriate box **or** fill the box completely. In items 2, 8 and 9, please fill the boxes with numerical answers (or as appropriate).

1. Gender:
   - [1] Male
   - [2] Female

2. Age: [ ]

3. Mother"s highest educational level:
   - [1] No formal education
   - [2] Primary education
   - [3] Secondary education
   - [4] Higher education
     - [1] Diploma
     - [2] Degrees
     - [3] Post graduate

4. Your mother"s occupation: _____

5. Father"s highest educational level:
   - [1] No formal education
   - [2] Primary education
   - [3] Secondary education
   - [4] Higher education
     - [1] Diploma
     - [2] Degrees
     - [3] Post Graduate

6. Your father"s occupation: _____

7. Which parent most desires you to choose physics courses?
   - [0] None
   - [1] Mother
   - [2] Father
   - [3] Both equally
   - [4] Caregiver

Please proceed to the next page

8.a. (For High School students only) Your grade in physics/physical science in the last 2 terms of the previous year.

[ ] & [ ]

8.b. (For University students only) Your grade in physics in the last 2 semesters. (If you are a First Year University student, please provide your 3rd and 4th quarter grades in your final year in high school.)

[ ] & [ ]

1.2 Your school and its physics curriculum

9. Which type of school/university do you go to? *[Tick appropriate box]*

[1] Government

[2] Private

[3] Catholic

[1] Single-sex school

[2] Co-educational school/uni

[3] Others – Please specify _____

10. The type of curriculum used for physics in your school/uni (if you do not know it, you can ask your teacher/instructor to provide you the answer). *[Tick appropriate box]*

[1] SACE

[2] IB

[3] University curriculum

[4] Others – Please specify _____

11. Number of hours you spend in physics classroom/lectures per week.

[ ] hours

12. Number of hours you spend in physics practicals/laboratory per week.

[ ] hours

13. Approximately how many times do you have homework assignment in physics per week?

[ ] times

14. Approximately how many times do you have quizzes/short tests in physics per week?

[ ] times

Please proceed to the next page

15. Approximately how many hours per week do you spend doing physics homework assignments?

hours

16. Approximately how many hours per week do you spend studying your physics notes/books at home?

hours

17. How many physics books do you use as a reference during the semester/year at your school?

1.3 Your perceptions of physics

18. What are your perceptions of physics in terms of job availability and job status in the society?

19. Do you think you will pursue a career in physics or anything related to physics?

☐ Yes

☐ No

Why?

Please proceed to the next page

Section 2: YOUR MOTIVATION TOWARDS LEARNING SCIENCE/PHYSICS (How motivated are you to learn science/physics?)

Use a DARK PEN to mark your response as follows: [X] Correct any mistakes by filling in the box as follows: [■] [X]

2.1 Self-efficacy

		Strongly disagree (1)	Disagree (2)	No opinion (3)	Agree (4)	Strongly agree (5)
20.	Whether the science content is difficult or easy, I am sure that I can understand it.	☐	☐	☐	☐	☐
21.	I am not confident about understanding difficult science concepts.	☐	☐	☐	☐	☐
22.	I am sure I can do well on science tests.	☐	☐	☐	☐	☐
23.	No matter how much effort I put in, I cannot learn science.	☐	☐	☐	☐	☐
24.	When science activities are too difficult, I give up or only do the easy parts.	☐	☐	☐	☐	☐
25.	During science activities, I prefer to ask other people for the answer rather than think for myself.	☐	☐	☐	☐	☐
26.	When I find the science content difficult, I do not try to learn it.	☐	☐	☐	☐	☐

2.2 Active learning strategies

		Strongly disagree (1)	Disagree (2)	No opinion (3)	Agree (4)	Strongly agree (5)
27.	When learning new science concepts, I attempt to understand them.	☐	☐	☐	☐	☐
28.	When learning new science concepts, I connect them to my previous experiences.	☐	☐	☐	☐	☐
29.	When I do not understand a science concept, I look for relevant resources that will help me.	☐	☐	☐	☐	☐
30.	When I do not understand a science concept, I would discuss with the teacher or other students to clarify my understanding.	☐	☐	☐	☐	☐
31.	During the learning processes, I attempt to make connections between the concepts that I learn.	☐	☐	☐	☐	☐
32.	When I make a mistake, I try to find out why.	☐	☐	☐	☐	☐
33.	When I meet science concepts that I do not understand, I still try to learn them.	☐	☐	☐	☐	☐

Please proceed to the next page

34. When new science concepts that I have learned conflict with my previous understanding, I try to understand why. ☐ ☐ ☐ ☐ ☐

2.3 Science learning value

	Strongly disagree (1)	Disagree (2)	No opinion (3)	Agree (4)	Strongly agree (5)
35. I think that learning science is important because I can use in my daily life.	☐	☐	☐	☐	☐
36. I think that learning science is important because it stimulates my thinking.	☐	☐	☐	☐	☐
37. In science, I think it is important to learn to solve problems.	☐	☐	☐	☐	☐
38. In science, I think it is important to participate in inquiry activities.	☐	☐	☐	☐	☐
39. It is important to have the opportunity to satisfy my own curiosity when learning science.	☐	☐	☐	☐	☐

2.4 Performance goal

	Strongly disagree (1)	Disagree (2)	No opinion (3)	Agree (4)	Strongly agree (5)
40. I participate in science courses to get a good grade.	☐	☐	☐	☐	☐
41. I participate in science courses to perform better than other students.	☐	☐	☐	☐	☐
42. I participate in science courses so that other students think that I'm smart.	☐	☐	☐	☐	☐
43. I participate in science courses so that the teacher pays attention to me.	☐	☐	☐	☐	☐

2.5 Achievement goal

	Strongly disagree (1)	Disagree (2)	No opinion (3)	Agree (4)	Strongly agree (5)
44. During a science course, I feel most fulfilled when I attain a good score in a test.	☐	☐	☐	☐	☐
45. I feel most fulfilled when I feel confident about the content in a science course.	☐	☐	☐	☐	☐
46. During a science course, I feel most fulfilled when I am able to solve a difficult problem.	☐	☐	☐	☐	☐
47. During a science course, I feel most fulfilled when the teacher accepts my ideas.	☐	☐	☐	☐	☐

Please proceed to the next page

48.	During a science course, I feel most fulfilled when other students accept my ideas.	☐	☐	☐	☐	☐

2.6 Learning environment stimulation

		Strongly disagree (1)	Disagree (2)	No opinion (3)	Agree (4)	Strongly agree (5)
49.	I like to participate in this science course because the content is exciting and changeable.	☐	☐	☐	☐	☐
50.	I like to participate in this science course because the teacher uses a variety of teaching methods.	☐	☐	☐	☐	☐
51.	I like to participate in this science course because the teacher does not put a lot of pressure on me.	☐	☐	☐	☐	☐
52.	I like to participate in this science course because the teacher pays attention to me.	☐	☐	☐	☐	☐
53.	I like to participate in this science course because it is challenging.	☐	☐	☐	☐	☐
54.	I like to participate in this science course because the students are involved in discussions.	☐	☐	☐	☐	☐

Stop! End of Session 1

Section 3: YOUR SELF-ESTEEM

Similar to what you did in Section 2, please rate the following items by marking the box that corresponds to what you think would reflect your self-esteem with an "**X**".

		Strongly agree (1)	Agree (2)	Disagree (3)	Strongly disagree (4)
55.	I feel that I am a person of worth, at least on an equal basis with others.	☐	☐	☐	☐
56.	I feel that I have a number of good qualities.	☐	☐	☐	☐
57.	All in all, I am inclined to feel that I am a failure.	☐	☐	☐	☐
58.	I am able to do things as well as most other people.	☐	☐	☐	☐
59.	I feel I don't have much to be proud of.	☐	☐	☐	☐
60.	I take a positive attitude toward myself.	☐	☐	☐	☐
61.	On the whole, I am satisfied with myself.	☐	☐	☐	☐
62.	I wish I could have more respect for myself.	☐	☐	☐	☐
63.	I certainly feel useless at times.	☐	☐	☐	☐
64.	At times I think I am no good at all.	☐	☐	☐	☐

Please proceed to the next page

Section 4: YOUR CLASSROOM CLIMATE

4.1 What actually happens in your physics classroom

This questionnaire contains statements about things which could happen in this classroom. You will be asked **how often** each practice **actually happens**.

There are no „right" or „wrong" answers. Your **opinion** is what is wanted.

Think about how well each statement describes what your actual classroom is like. For each of the following items, please mark the box that corresponds to your answer with an "**X**".

1 – if the practice *actually happens* **almost never**
2 – if the practice *actually happens* **seldom**
3 – if the practice *actually happens* **sometimes**
4 – if the practice *actually happens* **often**
5 – if the practice *actually happens* **very often**

REMEMBER: You are rating what ***actually happens*** in your physics classroom "*In our physics lessons…*"

		Almost never (1)	Seldom (2)	Sometimes (3)	Often (4)	Very often (5)
65.	The teacher talks with each student.	☐	☐	☐	☐	☐
66.	Students give their opinions during discussions.	☐	☐	☐	☐	☐
67.	The teacher decides where students sit.	☐	☐	☐	☐	☐
68.	Students find out the answers to questions from textbooks rather than from investigations.	☐	☐	☐	☐	☐
69.	Different students do different work.	☐	☐	☐	☐	☐
70.	The teacher takes a personal interest in each student.	☐	☐	☐	☐	☐
71.	The teacher lectures without students asking or answering questions.	☐	☐	☐	☐	☐
72.	Students choose their partners for group work.	☐	☐	☐	☐	☐
73.	Students carry out investigations to test ideas.	☐	☐	☐	☐	☐
74.	All students in the class do the same work at the same time.	☐	☐	☐	☐	☐
75.	The teacher is unfriendly to students.	☐	☐	☐	☐	☐
76.	Students" ideas and suggestions are used during classroom discussion.	☐	☐	☐	☐	☐
77.	Students are told how to behave in the classroom.	☐	☐	☐	☐	☐

Please proceed to the next page

		Almost never (1)	Seldom (2)	Sometimes (3)	Often (4)	Very often (5)
78.	Students carry out investigations to answer questions coming from class discussions.	☐	☐	☐	☐	☐
79.	Different students use different books, equipment and materials.	☐	☐	☐	☐	☐
80.	The teacher helps each student who is having trouble with the work.	☐	☐	☐	☐	☐
81.	Students ask the teacher questions.	☐	☐	☐	☐	☐
82.	The teacher decides which students should work together.	☐	☐	☐	☐	☐
83.	Students explain the meanings of statements, diagrams and graphs.	☐	☐	☐	☐	☐
84.	Students who work faster than others move on to the next topic.	☐	☐	☐	☐	☐
85.	The teacher considers students" feelings.	☐	☐	☐	☐	☐
86.	There is classroom discussion.	☐	☐	☐	☐	☐
87.	The teacher decides how much movement and talk there should be in the classroom.	☐	☐	☐	☐	☐
88.	Students carry out investigations to answer questions which puzzle them.	☐	☐	☐	☐	☐
89.	The same teaching aid (e.g. blackboard or overhead projector) is used for all students in the class.	☐	☐	☐	☐	☐

Please proceed to the next page

4.2 Your preferred physics classroom.

This questionnaire contains statements about things which could happen in this classroom. You will be asked **how often** you would **like** or **prefer** each practice to happen.

There are no „right" or „wrong" answers. Your **opinion** is what is wanted.

Think about how well each statement describes how you would really like your classroom to be. For each of the following items, please mark the box that corresponds to your answer with an "**X**".

1 – if you'd *prefer* the practice to happen **almost never**
2 – if you'd *prefer* the practice to happen **seldom**
3 – if you'd *prefer* the practice to happen **sometimes**
4 – if you'd *prefer* the practice to happen **often**
5 – if you'd *prefer* the practice to happen **very often**

REMEMBER: You are rating what ***you would like*** to happen in your physics classroom.
"*In my ideal physics lessons, I would like…*"

		Almost never (1)	Seldom (2)	Sometimes (3)	Often (4)	Very often (5)
90.	The teacher would talk to each student.	☐	☐	☐	☐	☐
91.	Students would give their opinions during discussions.	☐	☐	☐	☐	☐
92.	The teacher would decide where students sat.	☐	☐	☐	☐	☐
93.	Students would find out the answers to questions from textbooks rather than from investigations.	☐	☐	☐	☐	☐
94.	Different students would do different work.	☐	☐	☐	☐	☐
95.	The teacher would take personal interest in each student.	☐	☐	☐	☐	☐
96.	The teacher would lecture without students asking or answering questions.	☐	☐	☐	☐	☐
97.	Students would choose their partners for group work.	☐	☐	☐	☐	☐
98.	Students would carry out investigations to test ideas.	☐	☐	☐	☐	☐
99.	All students in the class would do the same work at the same time.	☐	☐	☐	☐	☐
100.	The teacher would be unfriendly to students.	☐	☐	☐	☐	☐
101.	Students' ideas and suggestions would be used during classroom discussion.	☐	☐	☐	☐	☐
102.	Students would be told how to behave in the classroom.	☐	☐	☐	☐	☐

Please proceed to the next page

		Almost never (1)	Seldom (2)	Sometimes (3)	Often (4)	Very often (5)
103.	Students would carry out investigations to answer questions coming from class discussions.	☐	☐	☐	☐	☐
104.	Different students would use different books, equipment and materials.	☐	☐	☐	☐	☐
105.	The teacher would help each student who was having trouble with the work.	☐	☐	☐	☐	☐
106.	Students would ask the teacher questions.	☐	☐	☐	☐	☐
107.	The teacher would decide which students should work together.	☐	☐	☐	☐	☐
108.	Students would explain the meanings of statements, diagrams and graphs.	☐	☐	☐	☐	☐
109.	Students who worked faster than others would move on to the next topic.	☐	☐	☐	☐	☐
110.	The teacher would consider students‟ feelings.	☐	☐	☐	☐	☐
111.	There would be classroom discussion.	☐	☐	☐	☐	☐
112.	The teacher would decide how much movement and talk there should be in the classroom.	☐	☐	☐	☐	☐
113.	Students would carry out investigations to answer questions which puzzled them.	☐	☐	☐	☐	☐
114.	The same teaching aid (e.g. blackboard or overhead projector) would be used for all students in the class.	☐	☐	☐	☐	☐

Please proceed to the next page

Section 5: YOUR ATTITUDES TOWARDS PHYSICS

How do you feel toward your physics subject(s), or anything that has to do with physics? For each of the following items in this section, please mark the box that would approximately show your attitudes towards physics with an "**X**".

		Strongly agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly disagree (5)
115.	There should be more effort made to educate the general public in physics.	☐	☐	☐	☐	☐
116.	To have a good understanding of the world in which we live one needs to study physics.	☐	☐	☐	☐	☐
117.	All high school students should be encouraged to take a course at some level in physics.	☐	☐	☐	☐	☐
118.	To not have taken a course in physics leaves a student unprepared for his/her place in society.	☐	☐	☐	☐	☐
119.	Physics should be considered an essential element in the general education of any high school student.	☐	☐	☐	☐	☐
120.	Physics is too materialistic and is opposed to humanism.	☐	☐	☐	☐	☐
121.	The effort to understand some physics is too great for the benefits obtained from it.	☐	☐	☐	☐	☐
122.	The amount of money being spent to teach physics could better be spent in other areas of our curriculum.	☐	☐	☐	☐	☐
123.	Only high school students who are college bound should take courses in physics.	☐	☐	☐	☐	☐
124.	Physics is too complicated for the average high school student.	☐	☐	☐	☐	☐

Stop! End of Session 2

Section 6: YOUR PARENTS' ASPIRATIONS

Please mark the box that corresponds to your answer with an "**X**".

6.1 Items relate to mother.

		Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
125.	My mother is *very interested* in my schoolwork.	☐	☐	☐	☐	☐
126.	My mother *often helps* me with my homework.	☐	☐	☐	☐	☐
127.	My mother *often speaks* to me about my schoolwork.	☐	☐	☐	☐	☐
128.	My mother *often praises* me for what I do at school.	☐	☐	☐	☐	☐
129.	My mother is a *great support* to me in my schoolwork.	☐	☐	☐	☐	☐
130.	My mother gives me *great encouragement* to stay on at school.	☐	☐	☐	☐	☐
131.	My mother *often tells* me about the importance of getting good education.	☐	☐	☐	☐	☐

132. How much education do you think your mother would like you to achieve, if at all possible (place a circle around the number that corresponds to your answer)

1. Leave school as soon as possible
2. Finish high school, or as much high school as possible
3. Finish high school, plus some further education such as junior college, community college, or vocational education college, but not go to university
4. At least some university
5. Graduate from university with a general degree such as a B.A.
6. Graduate from university with a degree from a professional faculty such as medicine, law, engineering, dentistry, or architecture
7. Graduate from university with a postgraduate qualification such as a Master's or Doctoral degree.

133. How much education do you think your mother *really* expects you to achieve?

1. Leave school as soon as possible
2. Finish high school, or as much high school as possible
3. Finish high school, plus some further education such as junior college, community college, or vocational education college, but not go to university
4. At least some university
5. Graduate from university with a general degree such as a B.A.
6. Graduate from university with a degree from a professional faculty such as medicine, law, engineering, dentistry, or architecture
7. Graduate from university with a postgraduate qualification such as a Master's or Doctoral degree.

134. What job or occupation do you think your mother would like you to have, if at all possible, when are about 25 years old?
Write down the ideal job:_____

Please proceed to the next page

135. What job or occupation do you think your mother *really* expects you to have when you are about 25 years old?
Write down the realistic job:_____

6.2 Items relate to father.

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
136. My father is *very interested* in my schoolwork.	☐	☐	☐	☐	☐
137. My father *often helps* me with my homework.	☐	☐	☐	☐	☐
138. My father *often speaks* to me about my schoolwork.	☐	☐	☐	☐	☐
139. My father *often praises* me for what I do at school.	☐	☐	☐	☐	☐
140. My father is a *great support* to me in my schoolwork.	☐	☐	☐	☐	☐
141. My father gives me *great encouragement* to stay on at school.	☐	☐	☐	☐	☐
142. My father *often tells* me about the importance of getting good education.	☐	☐	☐	☐	☐

143. How much education do you think your father would like you to achieve, if at all possible (place a circle around the number that corresponds to your answer)

1. Leave school as soon as possible
2. Finish high school, or as much high school as possible
3. Finish high school, plus some further education such as junior college, community college, or vocational education college, but not go to university
4. At least some university
5. Graduate from university with a general degree such as a B.A.
6. Graduate from university with a degree from a professional faculty such as medicine, law, engineering, dentistry, or architecture
7. Graduate from university with a postgraduate qualification such as a Master's or Doctoral degree.

144. How much education do you think your father *really* expects you to achieve?

1. Leave school as soon as possible
2. Finish high school, or as much high school as possible
3. Finish high school, plus some further education such as junior college, community college, or vocational education college, but not go to university
4. At least some university
5. Graduate from university with a general degree such as a B.A.
6. Graduate from university with a degree from a professional faculty such as medicine, law, engineering, dentistry, or architecture
7. Graduate from university with a postgraduate qualification such as a Master's or Doctoral degree.

145. What job or occupation do you think your father would like you to have, if at all possible, when are about 25 years old?
Write down the ideal job:_____

146. What job or occupation do you think your father *really* expects you to have when you are about 25 years old?
Write down the realistic job:_____

Please proceed to the next page

Section 7: COMPUTER USE AND ACCESS

The following questions will determine your access to computers and your frequency of computer use during school hours and at home, to estimate your level of experience in a range of computer related activities.

147. Do you have a computer at home? Yes [1] No [2]

148. Do you have good access to computers at school? Yes [1] No [2]

149. If you answered "no" to Question 1, where do you get access to a computer aside from school? *[Tick all that apply]* If you totally have no access to a computer you may stop completing the questionnaire from this point onwards.

- [1] Internet Café
- [2] A friend's computer
- [3] Others: Please specify _____

150. What do you use the computer for?

- [1] Schoolwork
- [2] Internet/email/chat
- [3] Playing games
- [4] Playing MP3s and videos
- [5] Programming
- [6] Others: Please specify _____

151. Your frequency of computer use

- [1] Never
- [2] Occasionally
- [3] Quite frequently
- [4] Daily

Please proceed to the next page

The following set of statements is a scale used to assess your beliefs, feelings and behaviours in relation to computers, and that there is no wrong or right answers. *[Mark the box that corresponds to your answer with an "**X**"]*

		Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
152.	Computers intimidate and threaten me.	☐	☐	☐	☐	☐
153.	All computer people talk in a strange and technical language.	☐	☐	☐	☐	☐
154.	I learn new computer tasks by trial and error.	☐	☐	☐	☐	☐
155.	Working with a computer makes me feel tense and uncomfortable.	☐	☐	☐	☐	☐
156.	Computers are difficult to understand.	☐	☐	☐	☐	☐
157.	Other students look to me for help when using the computer.	☐	☐	☐	☐	☐
158.	I feel helpless when asked to perform a new task on a computer.	☐	☐	☐	☐	☐
159.	When I have a problem with the computer, I will usually solve it on my own.	☐	☐	☐	☐	☐
160.	I feel important when others ask me for information about computers.	☐	☐	☐	☐	☐
161.	Learning about computers is a waste of time.	☐	☐	☐	☐	☐
162.	Using the computer has increased my interaction with other students.	☐	☐	☐	☐	☐
163.	Computers bore me.	☐	☐	☐	☐	☐
164.	Anything that a computer can be used for, I can do just as well in another way.	☐	☐	☐	☐	☐
165.	I develop shortcuts, and more efficient ways to use computers.	☐	☐	☐	☐	☐
166.	Working with computers makes me feel isolated from other people.	☐	☐	☐	☐	☐
167.	Working with computers will not be important to me in my career.	☐	☐	☐	☐	☐
168.	I would like to spend more time using a computer.	☐	☐	☐	☐	☐
169.	I do not feel I have control over what I do when I use a computer.	☐	☐	☐	☐	☐

Please proceed to the next page

		Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
170.	People that use computers are seen as being more important than those who don't.	☐	☐	☐	☐	☐
171.	If I can I will take subjects that will teach me to use computers.	☐	☐	☐	☐	☐
172.	Computers sometimes scare me.	☐	☐	☐	☐	☐
173.	I would like to learn more about computers.	☐	☐	☐	☐	☐
174.	I feel unhappy walking into a room filled with computers.	☐	☐	☐	☐	☐
175.	If I need computer skills for my career choice, I will develop them.	☐	☐	☐	☐	☐
176.	I am no good with computers.	☐	☐	☐	☐	☐
177.	To use computers you have to be highly qualified.	☐	☐	☐	☐	☐
178.	If my school offered a computer camp I would like to attend it.	☐	☐	☐	☐	☐
179.	Using computers prevents me from being creative.	☐	☐	☐	☐	☐
180.	Computers are confusing.	☐	☐	☐	☐	☐
181.	You have to be a "brain" to work with computers.	☐	☐	☐	☐	☐
182.	I get a sinking feeling when I think of trying to use a computer.	☐	☐	☐	☐	☐
183.	Computers frustrate me.	☐	☐	☐	☐	☐

Stop! End of Session 3

Thank you very much for your time.

CODEBOOK FOR STUDENTS' UPTAKE OF PHYSICS QUESTIONNAIRE (South Australia)

Variable Name	SPSS Variable Name	LISREL/HLM Latent Variable Name	Item Nos.	Type	Coding/Value
Schooling Level	SCHLVL	SchLEVEL	-	Numeric/Integer	0=University 1=High School 9=missing value
Gender	Gender	GNDR	GNDR1	Numeric/Integer	1=Male 2=Female 9=Missing Value
Age	Age	-	AGE2	Numeric/Integer	-
Mother's Highest Educational Level	MoHEL	-	MoHEL3	Numeric/Integer	1=No formal education 2=Primary Education 3=Secondary Education 4=Higher Education 5 (1)=Diploma 6 (2)=Degrees 7 (3)=Post Graduate 9=Missing value
Your mother's occupation	MOc	-	MOc4	String	-
Father's Highest Educational Level	FaHEL	-	FaHEL5	Numeric/Integer	1=No formal education 2=Primary Education 3=Secondary Education 4=Higher Education 5 (1)=Diploma 6 (2)=Degrees 7 (3)=Post Graduate 9=Missing value
Your father's occupation	FOc	-	FOc6	String	-
Which parent most desires you to choose Physics courses?	ParDes	-	ParDes7	Numeric/Integer	0=None 1=Mother 2=Father 3=Both equally 4=Caregiver 9=Missing Value
Which type of school/university do you go to?	SchTYPE	SchTYPE1	SchTYPE9	Numeric/Integer	0=Private 1=Government 9=missing value
		SchTYPE2		Numeric/Integer	0=Co-educational 1=Single sex 9=missing value
The type of curriculum used for Physics in your school/university.	SchCUR	SchCURR	SchCUR10	Numeric/Integer	0=University 1=SACE

Number of hours you spend in Physics classroom/lectures per week.	HRSLEC	-	HRSLEC11	Numeric	-
Number of hours you spend in Physics practicals/laboratory per week.	HRSPRC	-	HRSPRC12	Numeric	-
Approximately how many times do you have homework assignment in Physics per week?	HMWORK	-	HMWORK13	Numeric	-
Approximately how many times do you have quizzes/short tests in Physics per week?	QUZTST	-	QUZTST14	Numeric	-
Approximately how many hours per week do you spend doing Physics homework assignments?	HRSASN	-	HRSASN15	Numeric	
Approximately how many hours per week do you spend studying your Physics notes/books at home?	HRSSTDY	-	HRSSTY16	Numeric	
How many Physics books do you use as reference during the semester/year at your school?	NUMBKS	-	NUMBKS17	Numeric	
What are your perceptions of Physics in terms of job availability and job status in the society?	-	-	18	String	-
Do you think you will pursue a career in Physics or anything related to Physics?	-	-	19	Numeric/Integer/String	1=Yes 0=No 9=Missing Value
Your **MOTIVATION** towards learning Science/Physics -Self-Efficacy -Active Learning Strategies -Science Learning Value -Performance Goal	SLEFF	MotiSLEFF	SLEFF20 SLEFF21 SLEFF21R SLEFF22 SLEFF23 SLEFF23R SLEFF24 SLEFF24R SLEFF25 SLEFF25R	Likert type - Numeric/Integer	From **1** (Strongly disagree) to **5** (Strongly agree) *For all recoded items (Item numbers with "R"):* From **5** (Strongly disagree) to **1** (Strongly agree)

-Achievement Goal -Learning Env. Stimulation	ALS	MotiALS	SLEFF26 SLEFF26R ALS27 ALS28 ALS29 ALS30 ALS31 ALS32 ALS33 ALS34		9=Missing Value
	SLVAL	MotiSLVAL	SLVAL35 SLVAL36 SLVAL37 SLVAL38 SLVAL39		
	PERFG	MotiPERFG	PERFG40 PERFG40R PERFG41 PERFG41R PERFG42 PERFG42R PERFG43 PERFG43R		
	ACHVG	MotiACHVG	ACHVG44 ACHVG45 ACHVG46 ACHVG47 ACHVG48		From **1** (Strongly disagree) to **5** (Strongly agree) *For all recoded items (Item numbers with "R"):* From **5** (Strongly disagree) to **1** (Strongly agree) 9=Missing Value
	LERNV	MotiLERNV	LERNV49 LERNV50 LERNV51 LERNV52 LERNV53 LERNV54		
Your **SELF-ESTEEM**	S_EST	SelfEst	S_EST55 S_EST56 S_EST57 S_EST57R S_EST58 S_EST59 S_EST59R S_EST60 S_EST61 S_EST62 S_EST62R S_EST63 S_EST63R S_EST64	Likert type - Numeric/Integer	From **1** (Strongly agree) to **4** (Strongly disagree) *For all recoded items (Item numbers with "R"):* From **4** (Strongly agree) to **1** (Strongly disagree) 9=Missing Value

			S_EST64R		
Your **CLASSROOM CLIMATE (*Actual*)** -Personalisation -Participation -Independence -Investigation -Differentiation	PERSN PARTI INDEP INVES DFFER	CCAPersn CCAParti CCAIndep CCAInves CCADffer	PERSN65 PERSN70 PERSN75 PERSN75R PERSN80 PERSN85 PARTI66 PARTI71 PARTI71R PARTI76 PARTI81 PARTI86 INDEP67 INDEP67R INDEP72 INDEP77 INDEP77R INDEP82 INDEP82R INDEP87 INDEP87R INVES68 INVES68R INVES73 INVES78 INVES83 INVES88 DFFER69 DFFER74 DFFER74R DFFER79 DFFER84 DFFER89 DFFER89R	Likert type - Numeric/Integer	From **1** (Almost never) to **5** (Very often) *For all recoded items (Item numbers with "R"):* From **5** (Almost never) to **1** (Very often) 9=Missing Value
Your **CLASSROOM CLIMATE (*Preferred*)** -Personalisation -Participation -Independence -Investigation -Differentiation	PRSN PRTI INDP	CCPPrsn CCPPrti CCPIndp	PRSN90 PRSN95 PRSN100 PRSN100R PRSN105 PRSN110 PRTI91 PRTI96 PRTI96R PRTI101 PRTI106 PRTI111 INDP92 INDP92R INDP97	Likert type - Numeric/Integer	From **1** (Almost never) to **5** (Very often) *For all recoded items (Item numbers with "R"):* From **5** (Almost never) to **1** (Very often) 9=Missing Value

	INVS DFER	CCPInvs CCPDfer	INDP102 INDP102R INDP107 INDP107R INDP112 INDP112R INVS93 INVS93R INVS98 INVS103 INVS108 INVS113 DFER94 DFER99 DFER99R DFER104 DFER109 DFER114 DFER114R		
Your **ATTITUDES** towards Physics	ATTD	Attitude	ATTD115 ATTD116 ATTD117 ATTD118 ATTD119 ATTD120 ATTD120R ATTD121 ATTD121R ATTD122 ATTD122R ATTD123 ATTD123R ATTD124 ATTD124R	Likert type - Numeric/Integer	From **1** (Strongly agree) to **5** (Strongly disagree) *For all recoded items (Item numbers with "R"):* From **5** (Strongly agree) to **1** (Strongly disagree) 9=Missing Value
Your **PARENTS' ASPIRATIONS** **-**Mother -Father	PASPM PASPF	ParentsMUM ParentsDAD	PASPM125 PASPM126 PASPM127 PASPM128 PASPM129 PASPM130 PASPM131 PASPF136 PASPF137 PASPF138 PASPF139 PASPF140 PASPF141 PASPF142		From **1** (Strongly disagree) to **5** (Strongly agree) 9=Missing Value
How much education do you think your **mother** would like you to achieve, if at all	PASPM	-	PASPM132	Numeric/Integer	1=Leave school as soon as possible 2=Finish high school, or as much high school as possible

possible? How much education do you think your **mother** *really* expects you to achieve?	PASPM		PASPM133		3=Finish high school, plus some further education… 4=At least some university 5=Graduate from university with a general degree… 6=Graduate from university with a degree from professional faculty… 7=Graduate from university with a postgraduate… 9=Missing Value
What job or occupation do you think your **mother** would like you to have, if at all possible, when you are about 25 years old? What job or occupation do you think your **mother** *really* expects you to have when you are about 25 years old?	PASPM PASPM	-	PASPM134 PASPM135	String	-
How much education do you think your **father** would like you to achieve, if at all possible? How much education do you think your **father** *really* expects you to achieve?	PASPF PASPF	-	PASPF143 PASPF144	Numeric/Integer	1=Leave school as soon as possible 2=Finish high school, or as much high school as possible 3=Finish high school, plus some further education… 4=At least some university 5=Graduate from university with a general degree… 6=Graduate from university with a degree from professional faculty… 7=Graduate from university with a postgraduate… 9=Missing Value
What job or occupation do you think your **father** would like you to have, if at all	PASPF	-	PASPF145	String	-

possible, when you are about 25 years old? What job or occupation do you think your **father** *really* expects you to have when you are about 25 years old?	PASPF		PASPF146		
Do you have a computer at home?	COWN	-	COWN147	Numeric/Integer	1=Yes 0=No 9=Missing value
Do you have a good access to computers at school?	ACCS	-	ACCS148	Numeric/Integer	1=Yes 0=No 9=Missing value
If you answered "no" to Question 147, where do you get access to a computer aside from school? [Tick all that apply]	NOCOM	-	NOCOM149	Numeric/Integer	Internet Café 1= Yes 0=No Friend's computer 1=Yes 0=No Others 1=Yes 0=No 9=Missing Value
What do you use the computer for?	USE4	-	USE4150	Numeric/Integer	Schoolwork Internet/email/chat Playing games Playing MP3s and Videos Programming Others 1=Yes 0=No 9=Missing
Your frequency of computer use	FREQ	-	FREQ151	Numeric/Integer	1=Never 2=Occasionally 3=Quite frequently 4=Daily 9=Missing value
Your beliefs, feelings and behaviours in relation to computers -Affective -Behavioural -Cognitive	AFFC	CompAFFC	AFFC152 AFFC152R AFFC155 AFFC155R AFFC158 AFFC158R AFFC160 AFFC163 AFFC163R AFFC166 AFFC166R AFFC169 AFFC169R AFFC172 AFFC172R AFFC174 AFFC174R AFFC176 AFFC176R AFFC182	Numeric/Integer	From **1** (Strongly disagree) to **5** (Strongly agree) *For all recoded items (Item numbers with "R"):* From **5** (Strongly disagree) to **1** (Strongly agree) 9=Missing value

	BEHV	CompBEHV	AFFC182R AFFC183 AFFC183R BEHV154 BEHV157 BEHV159 BEHV162 BEHV165 BEHV168 BEHV171 BEHV173 BEHV175 BEHV178		
	COGN	CompCOGN	COGN153 COGN153R COGN156 COGN156R COGN161 COGN161R COGN164 COGN164R COGN167 COGN167R COGN170 COGN177 COGN177R COGN179 COGN179R COGN180 COGN180R COGN181 COGN181R		

Appendix B

The Students' Uptake of Physics Study Questionnaire (Philippines version) and Codebook

THE UNIVERSITY OF ADELAIDE
AUSTRALIA

SCHOOL OF EDUCATION

STUDENTS' UPTAKE OF PHYSICS
STUDY QUESTIONNAIRE

(For students in Philippine schools)

A project by:
Mr. Francisco L. Ben
School of Education
The University of Adelaide

Supervised by:
Dr. Sivakumar Alagumalai
Assoc. Prof. Chris Dawson
Dr. Darmawan I Gusti

Students' Uptake of Physics STUDY QUESTIONNAIRE

In this booklet you will find:

- *General Information* items
- Items about *Motivation*
- Items about *Self-esteem*
- Items about *Classroom Climate*
- Items about *Attitudes Toward Physics*
- Items about *Parents' Aspirations*
- Items about *Computer Use and Access*

Please read each question carefully and answer as accurately as you can. For this questionnaire, you will answer in several ways – by <ticking> a box, marking a box with an "X", or writing down a number that corresponds to your answer for a particular question/item. For a few questions you will need to write a short answer.

If you make a mistake in your answer, simply cross out (or shade the whole box) your error and mark the correct answer. If you make an error when writing an answer, simply cross it out and write the correct answer next to it.

In this questionnaire, there are no "right" or "wrong" answers. Your answers should be the ones that you think are "right" for you.

You may ask for help if you do not understand something or are not sure how to answer a question. General information about your school will be provided for you to be able to answer some of the items that pertain to your school.

Your answers will be combined with others to make totals and averages in which no individual can be identified. <u>All your answers and your identity will be kept strictly confidential</u>.

Your cooperation is greatly appreciated.

Thank you.

Student I.D.:

Student Name:

School Name:

Schooling Level:

☐ 4th Year High School
☐ First Year University

Please proceed to the next page

Section 1: GENERAL INFORMATION ABOUT YOU AND YOUR FAMILY, YOUR SCHOOL, AND YOUR PERCEPTIONS OF PHYSICS

1.1 You and your family

For each item, please circle the most appropriate box **or** fill the box completely. In items 2, 8 and 9, please fill the boxes with numerical answers (or as appropriate).

1. Gender:
   - 1 Male
   - 2 Female

2. Age: ☐

3. Mother‟s highest educational level:
   - 1 No formal education
   - 2 Primary education
   - 3 Secondary education
   - 4 Higher education
     - ☐ Diploma
     - ☐ Degrees
     - ☐ Post graduate

4. Your mother‟s occupation: _____

5. Father‟s highest educational level:
   - 1 No formal education
   - 2 Primary education
   - 3 Secondary education
   - 4 Higher education
     - ☐ Diploma
     - ☐ Degrees
     - ☐ Post Graduate

6. Your father‟s occupation: _____

7. Which parent most desires you to choose physics courses?
   - 1 Mother
   - 2 Father
   - 3 Both equally
   - 4 Caregiver

Please proceed to the next page

8.a. (For High School students only) Your grade in physics in the last 2 grading periods.

[ ] & [ ]

8.b. (For University students only) Your grade in physics in the last 2 semesters. (If you are a First Year University student, please provide your 3rd and 4th quarter grades in your final year in high school.)

[ ] & [ ]

1.2 Your school and its physics curriculum

9. Which type of school/university do you go to? *[Tick appropriate box]*

- [ ] Government
- [ ] Private
- [ ] Single-sex school
- [ ] Co-educational school
- [ ] Catholic
- [ ] Others – Please specify _____

10. The type of curriculum used for physics in your school/university (if you do not know it, you can ask your teacher/instructor to provide you the answer). *[Tick appropriate box]*

- [ ] DepED-prescribed / CHED-prescribed (for univ. level students)
- [ ] Private(DepED-based) / CHED-prescribed (for univ. level students)
- [ ] Others – Please specify _____

11. Number of hours you spend in physics classroom/lectures per week.

[hours]

12. Number of hours you spend in physics practicals/laboratory per week.

[hours]

13. Approximately how many times do you have homework/assignment in physics per week?

[times]

14. Approximately how many times do you have quizzes/short tests in physics per week?

[times]

Please proceed to the next page

15. Approximately how many hours per week do you spend doing physics homework assignments?

hours

16. Approximately how many hours per week do you spend studying your physics notes/books at home?

hours

17. How many physics books do you use as a reference during the semester/year at your school?

1.3 Your perceptions of physics

18. What are your perceptions of physics in terms of job availability and job status in the society?

19. Do you think you will pursue a career in physics or anything related to physics?

Yes

No

Why?

Please proceed to the next page

Section 2: YOUR MOTIVATION TOWARDS LEARNING SCIENCE/PHYSICS (How motivated are you to learn science/physics?)

Use a DARK PEN to mark your response as follows: [X] Correct any mistakes by filling in the box as follows: [■] [X]

2.1 Self-efficacy

		Strongly disagree (1)	Disagree (2)	No opinion (3)	Agree (4)	Strongly agree (5)
20.	Whether the science content is difficult or easy, I am sure that I can understand it.	☐	☐	☐	☐	☐
21.	I am not confident about understanding difficult science concepts.	☐	☐	☐	☐	☐
22.	I am sure I can do well on science tests.	☐	☐	☐	☐	☐
23.	No matter how much effort I put in, I cannot learn science.	☐	☐	☐	☐	☐
24.	When science activities are too difficult, I give up or only do the easy parts.	☐	☐	☐	☐	☐
25.	During science activities, I prefer to ask other people for the answer rather than think for myself.	☐	☐	☐	☐	☐
26.	When I find the science content difficult, I do not try to learn it.	☐	☐	☐	☐	☐

2.2 Active learning strategies

		Strongly disagree (1)	Disagree (2)	No opinion (3)	Agree (4)	Strongly agree (5)
27.	When learning new science concepts, I attempt to understand them.	☐	☐	☐	☐	☐
28.	When learning new science concepts, I connect them to my previous experiences.	☐	☐	☐	☐	☐
29.	When I do not understand a science concept, I look for relevant resources that will help me.	☐	☐	☐	☐	☐
30.	When I do not understand a science concept, I would discuss with the teacher or other students to clarify my understanding.	☐	☐	☐	☐	☐
31.	During the learning processes, I attempt to make connections between the concepts that I learn.	☐	☐	☐	☐	☐
32.	When I make a mistake, I try to find out why.	☐	☐	☐	☐	☐
33.	When I meet science concepts that I do not understand, I still try to learn them.	☐	☐	☐	☐	☐

Please proceed to the next page

34. When new science concepts that I have learned conflict with my previous understanding, I try to understand why. ☐ ☐ ☐ ☐ ☐

2.4 Science learning value

	Strongly disagree (1)	Disagree (2)	No opinion (3)	Agree (4)	Strongly agree (5)
35. I think that learning science is important because I can use in my daily life.	☐	☐	☐	☐	☐
36. I think that learning science is important because it stimulates my thinking.	☐	☐	☐	☐	☐
37. In science, I think it is important to learn to solve problems.	☐	☐	☐	☐	☐
38. In science, I think it is important to participate in inquiry activities.	☐	☐	☐	☐	☐
39. It is important to have the opportunity to satisfy my own curiosity when learning science.	☐	☐	☐	☐	☐

2.5 Performance goal

	Strongly disagree (1)	Disagree (2)	No opinion (3)	Agree (4)	Strongly agree (5)
55. I participate in science courses to get a good grade.	☐	☐	☐	☐	☐
56. I participate in science courses to perform better than other students.	☐	☐	☐	☐	☐
57. I participate in science courses so that other students think that I"m smart.	☐	☐	☐	☐	☐
58. I participate in science courses so that the teacher pays attention to me.	☐	☐	☐	☐	☐

2.5 Achievement goal

	Strongly disagree (1)	Disagree (2)	No opinion (3)	Agree (4)	Strongly agree (5)
59. During a science course, I feel most fulfilled when I attain a good score in a test.	☐	☐	☐	☐	☐
60. I feel most fulfilled when I feel confident about the content in a science course.	☐	☐	☐	☐	☐
61. During a science course, I feel most fulfilled when I am able to solve a difficult problem.	☐	☐	☐	☐	☐
62. During a science course, I feel most fulfilled when the teacher accepts my ideas.	☐	☐	☐	☐	☐

Please proceed to the next page

63.	During a science course, I feel most fulfilled when other students accept my ideas.	☐	☐	☐	☐	☐

2.7 Learning environment stimulation

		Strongly disagree (1)	Disagree (2)	No opinion (3)	Agree (4)	Strongly agree (5)
64.	I like to participate in this science course because the content is exciting and changeable.	☐	☐	☐	☐	☐
65.	I like to participate in this science course because the teacher uses a variety of teaching methods.	☐	☐	☐	☐	☐
66.	I like to participate in this science course because the teacher does not put a lot of pressure on me.	☐	☐	☐	☐	☐
67.	I like to participate in this science course because the teacher pays attention to me.	☐	☐	☐	☐	☐
68.	I like to participate in this science course because it is challenging.	☐	☐	☐	☐	☐
69.	I like to participate in this science course because the students are involved in discussions.	☐	☐	☐	☐	☐

Stop! End of Session 1

Section 3: YOUR SELF-ESTEEM

Similar to what you did in Section 2, please rate the following items by marking the box that corresponds to what you think would reflect your self-esteem with an "**X**".

		Strongly agree (1)	Agree (2)	Disagree (3)	Strongly disagree (4)
55.	I feel that I am a person of worth, at least on an equal basis with others.	☐	☐	☐	☐
56.	I feel that I have a number of good qualities.	☐	☐	☐	☐
57.	All in all, I am inclined to feel that I am a failure.	☐	☐	☐	☐
58.	I am able to do things as well as most other people.	☐	☐	☐	☐
59.	I feel I don't have much to be proud of.	☐	☐	☐	☐
60.	I take a positive attitude toward myself.	☐	☐	☐	☐
61.	On the whole, I am satisfied with myself.	☐	☐	☐	☐
62.	I wish I could have more respect for myself.	☐	☐	☐	☐
63.	I certainly feel useless at times.	☐	☐	☐	☐
64.	At times I think I am no good at all.	☐	☐	☐	☐

Please proceed to the next page

Section 4: YOUR CLASSROOM CLIMATE

4.1 What actually happens in your physics classroom

This questionnaire contains statements about things which could happen in this classroom. You will be asked **how often** each practice **actually happens**.

There are no „right" or „wrong" answers. Your **opinion** is what is wanted.

Think about how well each statement describes what your actual classroom is like. For each of the following items, please mark the box that corresponds to your answer with an "**X**".

1 – if the practice *actually happens* **almost never**
2 – if the practice *actually happens* **seldom**
3 – if the practice *actually happens* **sometimes**
4 – if the practice *actually happens* **often**
5 – if the practice *actually happens* **very often**

REMEMBER: You are rating what ***actually happens*** in your physics classroom. "*In our physics lessons…*"

		Almost never (1)	Seldom (2)	Sometimes (3)	Often (4)	Very often (5)
65.	The teacher talks with each student.	☐	☐	☐	☐	☐
66.	Students give their opinions during discussions.	☐	☐	☐	☐	☐
67.	The teacher decides where students sit.	☐	☐	☐	☐	☐
68.	Students find out the answers to questions from textbooks rather than from investigations.	☐	☐	☐	☐	☐
69.	Different students do different work.	☐	☐	☐	☐	☐
70.	The teacher takes a personal interest in each student.	☐	☐	☐	☐	☐
71.	The teacher lectures without students asking or answering questions.	☐	☐	☐	☐	☐
72.	Students choose their partners for group work.	☐	☐	☐	☐	☐
73.	Students carry out investigations to test ideas.	☐	☐	☐	☐	☐
74.	All students in the class do the same work at the same time.	☐	☐	☐	☐	☐
75.	The teacher is unfriendly to students.	☐	☐	☐	☐	☐
76.	Students" ideas and suggestions are used during classroom discussion.	☐	☐	☐	☐	☐
77.	Students are told how to behave in the classroom.	☐	☐	☐	☐	☐

Please proceed to the next page

		Almost never (1)	Seldom (2)	Sometimes (3)	Often (4)	Very often (5)
78.	Students carry out investigations to answer questions coming from class discussions.	☐	☐	☐	☐	☐
79.	Different students use different books, equipment and materials.	☐	☐	☐	☐	☐
80.	The teacher helps each student who is having trouble with the work.	☐	☐	☐	☐	☐
81.	Students ask the teacher questions.	☐	☐	☐	☐	☐
82.	The teacher decides which students should work together.	☐	☐	☐	☐	☐
83.	Students explain the meanings of statements, diagrams and graphs.	☐	☐	☐	☐	☐
84.	Students who work faster than others move on to the next topic.	☐	☐	☐	☐	☐
85.	The teacher considers students" feelings.	☐	☐	☐	☐	☐
86.	There is classroom discussion.	☐	☐	☐	☐	☐
87.	The teacher decides how much movement and talk there should be in the classroom.	☐	☐	☐	☐	☐
88.	Students carry out investigations to answer questions which puzzle them.	☐	☐	☐	☐	☐
89.	The same teaching aid (e.g. blackboard or overhead projector) is used for all students in the class.	☐	☐	☐	☐	☐

Please proceed to the next page

4.2 Your preferred physics classroom.

This questionnaire contains statements about things which could happen in this classroom. You will be asked **how often** you would **like** or **prefer** each practice to happen.

There are no „right" or „wrong" answers. Your **opinion** is what is wanted.

Think about how well each statement describes how you would really like your classroom to be. For each of the following items, please mark the box that corresponds to your answer with an "**X**".

1 – if you'd *prefer* the practice to happen **almost never**
2 – if you'd *prefer* the practice to happen **seldom**
3 – if you'd *prefer* the practice to happen **sometimes**
4 – if you'd *prefer* the practice to happen **often**
5 – if you'd *prefer* the practice to happen **very often**

REMEMBER: You are rating what ***you would like*** to happen in your physics classroom.
"*In my ideal physics lessons, I would like…*"

		Almost never (1)	Seldom (2)	Sometimes (3)	Often (4)	Very often (5)
90.	The teacher would talk to each student.	☐	☐	☐	☐	☐
91.	Students would give their opinions during discussions.	☐	☐	☐	☐	☐
92.	The teacher would decide where students sat.	☐	☐	☐	☐	☐
93.	Students would find out the answers to questions from textbooks rather than from investigations.	☐	☐	☐	☐	☐
94.	Different students would do different work.	☐	☐	☐	☐	☐
95.	The teacher would take personal interest in each student.	☐	☐	☐	☐	☐
96.	The teacher would lecture without students asking or answering questions.	☐	☐	☐	☐	☐
97.	Students would choose their partners for group work.	☐	☐	☐	☐	☐
98.	Students would carry out investigations to test ideas.	☐	☐	☐	☐	☐
99.	All students in the class would do the same work at the same time.	☐	☐	☐	☐	☐
100.	The teacher would be unfriendly to students.	☐	☐	☐	☐	☐
101.	Students' ideas and suggestions would be used during classroom discussion.	☐	☐	☐	☐	☐
102.	Students would be told how to behave in the classroom.	☐	☐	☐	☐	☐

Please proceed to the next page

		Almost never (1)	Seldom (2)	Sometimes (3)	Often (4)	Very often (5)
103.	Students would carry out investigations to answer questions coming from class discussions.	☐	☐	☐	☐	☐
104.	Different students would use different books, equipment and materials.	☐	☐	☐	☐	☐
105.	The teacher would help each student who was having trouble with the work.	☐	☐	☐	☐	☐
106.	Students would ask the teacher questions.	☐	☐	☐	☐	☐
107.	The teacher would decide which students should work together.	☐	☐	☐	☐	☐
108.	Students would explain the meanings of statements, diagrams and graphs.	☐	☐	☐	☐	☐
109.	Students who worked faster than others would move on to the next topic.	☐	☐	☐	☐	☐
110.	The teacher would consider students‟ feelings.	☐	☐	☐	☐	☐
111.	There would be classroom discussion.	☐	☐	☐	☐	☐
112.	The teacher would decide how much movement and talk there should be in the classroom.	☐	☐	☐	☐	☐
113.	Students would carry out investigations to answer questions which puzzled them.	☐	☐	☐	☐	☐
114.	The same teaching aid (e.g. blackboard or overhead projector) would be used for all students in the class.	☐	☐	☐	☐	☐

Please proceed to the next page

Section 5: YOUR ATTITUDES TOWARDS PHYSICS

How do you feel toward your physics subject(s), or anything that has to do with physics? For each of the following items in this section, please mark the box that would approximately show your attitudes towards physics with an "**X**".

		Strongly agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly disagree (5)
115.	There should be more effort made to educate the general public in physics.	☐	☐	☐	☐	☐
116.	To have a good understanding of the world in which we live one needs to study physics.	☐	☐	☐	☐	☐
117.	All high school students should be encouraged to take a course at some level in physics.	☐	☐	☐	☐	☐
118.	To not have taken a course in physics leaves a student unprepared for his/her place in society.	☐	☐	☐	☐	☐
119.	Physics should be considered an essential element in the general education of any high school student.	☐	☐	☐	☐	☐
120.	Physics is too materialistic and is opposed to humanism.	☐	☐	☐	☐	☐
121.	The effort to understand some physics is too great for the benefits obtained from it.	☐	☐	☐	☐	☐
122.	The amount of money being spent to teach physics could better be spent in other areas of our curriculum.	☐	☐	☐	☐	☐
123.	Only high school students who are college bound should take courses in physics.	☐	☐	☐	☐	☐
124.	Physics is too complicated for the average high school student.	☐	☐	☐	☐	☐

Stop! End of Session 2

Section 6: YOUR PARENTS' ASPIRATIONS

Please mark the box that corresponds to your answer with an "**X**".

6.1 Items relate to mother.

		Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
125.	My mother is *very interested* in my schoolwork.	☐	☐	☐	☐	☐
126.	My mother *often helps* me with my homework.	☐	☐	☐	☐	☐
127.	My mother *often speaks* to me about my schoolwork.	☐	☐	☐	☐	☐
128.	My mother *often praises* me for what I do at school.	☐	☐	☐	☐	☐
129.	My mother is a *great support* to me in my schoolwork.	☐	☐	☐	☐	☐
130.	My mother gives me *great encouragement* to stay on at school.	☐	☐	☐	☐	☐
131.	My mother *often tells* me about the importance of getting good education.	☐	☐	☐	☐	☐

132. How much education do you think your mother would like you to achieve, if at all possible (place a circle around the number that corresponds to your answer)

1. Leave school as soon as possible
2. Finish high school, or as much high school as possible
3. Finish high school, plus some further education such as junior college, community college, or vocational education college, but not go to university
4. At least some university
5. Graduate from university with a general degree such as a B.A.
6. Graduate from university with a degree from a professional faculty such as medicine, law, engineering, dentistry, or architecture
7. Graduate from university with a postgraduate qualification such as a Master's or Doctoral degree.

133. How much education do you think your mother *really* expects you to achieve?

1. Leave school as soon as possible
2. Finish high school, or as much high school as possible
3. Finish high school, plus some further education such as junior college, community college, or vocational education college, but not go to university
4. At least some university
5. Graduate from university with a general degree such as a B.A.
6. Graduate from university with a degree from a professional faculty such as medicine, law, engineering, dentistry, or architecture
7. Graduate from university with a postgraduate qualification such as a Master's or Doctoral degree.

134. What job or occupation do you think your mother would like you to have, if at all possible, when are about 25 years old?
Write down the ideal job:_____

Please proceed to the next page

135. What job or occupation do you think your mother *really* expects you to have when you are about 25 years old?
Write down the realistic job:_____

6.2 Items relate to father.

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
136. My father is *very interested* in my schoolwork.	☐	☐	☐	☐	☐
137. My father *often helps* me with my homework.	☐	☐	☐	☐	☐
138. My father *often speaks* to me about my schoolwork.	☐	☐	☐	☐	☐
139. My father *often praises* me for what I do at school.	☐	☐	☐	☐	☐
140. My father is a *great support* to me in my schoolwork.	☐	☐	☐	☐	☐
141. My father gives me *great encouragement* to stay on at school.	☐	☐	☐	☐	☐
142. My father *often tells* me about the importance of getting good education.	☐	☐	☐	☐	☐

143. How much education do you think your father would like you to achieve, if at all possible (place a circle around the number that corresponds to your answer)

1. Leave school as soon as possible
2. Finish high school, or as much high school as possible
3. Finish high school, plus some further education such as junior college, community college, or vocational education college, but not go to university
4. At least some university
5. Graduate from university with a general degree such as a B.A.
6. Graduate from university with a degree from a professional faculty such as medicine, law, engineering, dentistry, or architecture

7. Graduate from university with a postgraduate qualification such as a Master's or Doctoral degree.

144. How much education do you think your father *really* expects you to achieve?

1. Leave school as soon as possible
2. Finish high school, or as much high school as possible
3. Finish high school, plus some further education such as junior college, community college, or vocational education college, but not go to university
4. At least some university
5. Graduate from university with a general degree such as a B.A.
6. Graduate from university with a degree from a professional faculty such as medicine, law, engineering, dentistry, or architecture

7. Graduate from university with a postgraduate qualification such as a Master's or Doctoral degree.

145. What job or occupation do you think your father would like you to have, if at all possible, when are about 25 years old?
Write down the ideal job:_____

146. What job or occupation do you think your father *really* expects you to have when you are about 25 years old?
Write down the realistic job:_____

Please proceed to the next page

Section 7: COMPUTER USE AND ACCESS

The following questions will determine your access to computers and your frequency of computer use during school hours and at home, to estimate your level of experience in a range of computer related activities.

147. Do you have a computer at home? Yes ☐ No ☐

148. Do you have good access to computers at school? Yes ☐ No ☐

149. If you answered "no" to Question 1, where do you get access to a computer aside from school? *[Tick all that apply]* If you totally have no access to a computer you may stop completing the questionnaire from this point onwards.

- ☐ Internet Café
- ☐ A friend's computer
- ☐ Others: Please specify _____

150. What do you use the computer for?

- ☐ Schoolwork
- ☐ Internet/email/chat
- ☐ Playing games
- ☐ Playing MP3s and videos
- ☐ Programming
- ☐ Others: Please specify _____

151. Your frequency of computer use

- ☐ Never
- ☐ Occasionally
- ☐ Quite frequently
- ☐ Daily

Please proceed to the next page

The following set of statements is a scale used to assess your beliefs, feelings and behaviours in relation to computers, and that there is no wrong or right answers. *[Mark the box that corresponds to your answer with an "**X**"]*

		Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
152.	Computers intimidate and threaten me.	☐	☐	☐	☐	☐
153.	All computer people talk in a strange and technical language.	☐	☐	☐	☐	☐
154.	I learn new computer tasks by trial and error.	☐	☐	☐	☐	☐
155.	Working with a computer makes me feel tense and uncomfortable.	☐	☐	☐	☐	☐
156.	Computers are difficult to understand.	☐	☐	☐	☐	☐
157.	Other students look to me for help when using the computer.	☐	☐	☐	☐	☐
158.	I feel helpless when asked to perform a new task on a computer.	☐	☐	☐	☐	☐
159.	When I have a problem with the computer, I will usually solve it on my own.	☐	☐	☐	☐	☐
160.	I feel important when others ask me for information about computers.	☐	☐	☐	☐	☐
161.	Learning about computers is a waste of time.	☐	☐	☐	☐	☐
162.	Using the computer has increased my interaction with other students.	☐	☐	☐	☐	☐
163.	Computers bore me.	☐	☐	☐	☐	☐
164.	Anything that a computer can be used for, I can do just as well in another way.	☐	☐	☐	☐	☐
165.	I develop shortcuts, and more efficient ways to use computers.	☐	☐	☐	☐	☐
166.	Working with computers makes me feel isolated from other people.	☐	☐	☐	☐	☐
167.	Working with computers will not be important to me in my career.	☐	☐	☐	☐	☐
168.	I would like to spend more time using a computer.	☐	☐	☐	☐	☐
169.	I do not feel I have control over what I do when I use a computer.	☐	☐	☐	☐	☐

Please proceed to the next page

		Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
170.	People that use computers are seen as being more important than those who don't.	☐	☐	☐	☐	☐
171.	If I can I will take subjects that will teach me to use computers.	☐	☐	☐	☐	☐
172.	Computers sometimes scare me.	☐	☐	☐	☐	☐
173.	I would like to learn more about computers.	☐	☐	☐	☐	☐
174.	I feel unhappy walking into a room filled with computers.	☐	☐	☐	☐	☐
175.	If I need computer skills for my career choice, I will develop them.	☐	☐	☐	☐	☐
176.	I am no good with computers.	☐	☐	☐	☐	☐
177.	To use computers you have to be highly qualified.	☐	☐	☐	☐	☐
178.	If my school offered a computer camp I would like to attend it.	☐	☐	☐	☐	☐
179.	Using computers prevents me from being creative.	☐	☐	☐	☐	☐
180.	Computers are confusing.	☐	☐	☐	☐	☐
181.	You have to be a "brain" to work with computers.	☐	☐	☐	☐	☐
182.	I get a sinking feeling when I think of trying to use a computer.	☐	☐	☐	☐	☐
183.	Computers frustrate me.	☐	☐	☐	☐	☐

Stop! End of Session 3

END OF QUESTIONNAIRE

THANK YOU FOR YOUR TIME

CODEBOOK FOR STUDENTS' UPTAKE OF PHYSICS QUESTIONNAIRE (Philippines)

Variable Name	SPSS Variable Name	LISREL/HLM Latent Variable Name	Item Nos.	Type	Coding/Value
Schooling Level	SCHLVL	SchLEVEL	-	Numeric/Integer	0=University 1=High School 9=missing value
Gender	Gender	GNDR	GNDR1	Numeric/Integer	0=Female 1=Male 9=missing
Age	Age	-	AGE2	Numeric/Integer	-
Mother's Highest Educational Level	MoHEL	-	MoHEL3	Numeric/Integer	1=No formal education 2=Primary Education 3=Secondary Education 4=Higher Education 5 (1)=Diploma 6 (2)=Degrees 7 (3)=Post Graduate 9=Missing value
Your mother's occupation	MOc	-	MOc4	String	-
Father's Highest Educational Level	FaHEL	-	FaHEL5	Numeric/Integer	1=No formal education 2=Primary Education 3=Secondary Education 4=Higher Education 5 (1)=Diploma 6 (2)=Degrees 7 (3)=Post Graduate 9=Missing value
Your father's occupation	FOc	-	FOc6	String	-
Which parent most desires you to choose Physics courses?	ParDes	-	ParDes7	Numeric/Integer	0=None 1=Mother 2=Father 3=Both equally 4=Caregiver 9=Missing Value
Which type of school/university do you go to?	SchTYPE	SchTYPE1	SchTYPE9	Numeric/Integer	0=Private 1=Government 9=missing
The type of curriculum used for Physics in your school/university.	SchCUR	SchCURR	SchCUR10	Numeric/Integer	0=university 1=DepEd 9=missing
Number of hours you spend in Physics classroom/lectures per week.	HRSLEC		HRSLEC11	Numeric	-
Number of hours you spend in Physics practicals/laboratory	HRSPRC		HRSPRC12	Numeric	-

per week.					
Approximately how many times do you have homework assignment in Physics per week?	HMWORK		HMWORK13	Numeric	-
Approximately how many times do you have quizzes/short tests in Physics per week?	QUZTST		QUZTST14	Numeric	-
Approximately how many hours per week do you spend doing Physics homework assignments?	HRSASN		HRSASN15	Numeric	
Approximately how many hours per week do you spend studying your Physics notes/books at home?	HRSSTDY		HRSSTY16	Numeric	
How many Physics books do you use as reference during the semester/year at your school?	NUMBKS		NUMBKS17	Numeric	
What are your perceptions of Physics in terms of job availability and job status in the society?	-		18	String	-
Do you think you will pursue a career in Physics or anything related to Physics?	-		19	Numeric/Integer/String	1=Yes 0=No 9=Missing Value
Your **MOTIVATION** towards learning Science/Physics -Self-Efficacy -Active Learning Strategies -Science Learning Value -Performance Goal -Achievement Goal -Learning Env. Stimulation	SLEFF ALS	MotiSLEFF MotiALS	SLEFF20 SLEFF21 SLEFF21R SLEFF22 SLEFF23 SLEFF23R SLEFF24 SLEFF24R SLEFF25 SLEFF25R SLEFF26 SLEFF26R ALS27 ALS28 ALS29 ALS30 ALS31 ALS32 ALS33 ALS34 SLVAL35 SLVAL36	Likert type - Numeric/Integer	From **1** (Strongly disagree) to **5** (Strongly agree) *For all recoded items (Item numbers with "R"):* From **5** (Strongly disagree) to **1** (Strongly agree) 9=Missing Value

	SLVAL PERFG ACHVG LERNV	MotiSLVAL MotiPERFG MotiACHVG MotiLERNV	SLVAL37 SLVAL38 SLVAL39 PERFG40 PERFG40R PERFG41 PERFG41R PERFG42 PERFG42R PERFG43 PERFG43R ACHVG44 ACHVG45 ACHVG46 ACHVG47 ACHVG48 LERNV49 LERNV50 LERNV51 LERNV52 LERNV53 LERNV54		From **1** (Strongly disagree) to **5** (Strongly agree) *For all recoded items (Item numbers with "R"):* From **5** (Strongly disagree) to **1** (Strongly agree) 9=Missing Value
Your **SELF-ESTEEM**	S_EST	SelfEst	S_EST55 S_EST56 S_EST57 S_EST57R S_EST58 S_EST59 S_EST59R S_EST60 S_EST61 S_EST62 S_EST62R S_EST63 S_EST63R S_EST64 S_EST64R	Likert type - Numeric/Integer	From **1** (Strongly agree) to **4** (Strongly disagree) *For all recoded items (Item numbers with "R"):* From **4** (Strongly agree) to **1** (Strongly disagree) 9=Missing Value
Your **CLASSROOM CLIMATE (*Actual*)** -Personalisation -Participation -Independence -Investigation -Differentiation	PERSN PARTI	CCAPersn CCAParti	PERSN65 PERSN70 PERSN75 PERSN75R PERSN80 PERSN85 PARTI66 PARTI71 PARTI71R PARTI76 PARTI81 PARTI86 INDEP67 INDEP67R	Likert type - Numeric/Integer	From **1** (Almost never) to **5** (Very often) *For all recoded items (Item numbers with "R"):* From **5** (Almost never) to **1** (Very often) 9=Missing Value

	INDEP	CCAIndep	INDEP72 INDEP77 INDEP77R INDEP82 INDEP82R INDEP87 INDEP87R		
	INVES	CCAInves	INVES68 INVES68R INVES73 INVES78 INVES83 INVES88		
	DFFER	CCADffer	DFFER69 DFFER74 DFFER74R DFFER79 DFFER84 DFFER89 DFFER89R		
Your **CLASSROOM CLIMATE (*Preferred*)** -Personalisation -Participation -Independence -Investigation -Differentiation	PRSN	CCPPrsn	PRSN90 PRSN95 PRSN100 PRSN100R PRSN105 PRSN110	Likert type - Numeric/Integer	From **1** (Almost never) to **5** (Very often) *For all recoded items (Item numbers with "R"):* From **5** (Almost never) to **1** (Very often) 9=Missing Value
	PRTI	CCPPrti	PRTI91 PRTI96 PRTI96R PRTI101 PRTI106 PRTI111		
	INDP	CCPIndp	INDP92 INDP92R INDP97 INDP102 INDP102R INDP107 INDP107R INDP112 INDP112R		
	INVS	CCPInvs	INVS93 INVS93R INVS98 INVS103 INVS108 INVS113		
	DFER	CCPDfer	DFER94 DFER99 DFER99R DFER104 DFER109 DFER114 DFER114R		
Your **ATTITUDES** towards Physics		Attitude	ATTD115 ATTD116	Likert type - Numeric/Integer	From **1** (Strongly agree) to **5**

	ATTD		ATTD117 ATTD118 ATTD119 ATTD120 ATTD120R ATTD121 ATTD121R ATTD122 ATTD122R ATTD123 ATTD123R ATTD124 ATTD124R		(Strongly disagree) *For all recoded items (Item numbers with "R"):* From **5** (Strongly agree) to **1** (Strongly disagree) 9=Missing Value
Your **PARENTS' ASPIRATIONS** -Mother -Father	PASPM PASPF	ParentsMUM ParentsDAD	PASPM125 PASPM126 PASPM127 PASPM128 PASPM129 PASPM130 PASPM131 PASPF136 PASPF137 PASPF138 PASPF139 PASPF140 PASPF141 PASPF142		From **1** (Strongly disagree) to **5** (Strongly agree) 9=Missing Value
How much education do you think your **mother** would like you to achieve, if at all possible? How much education do you think your **mother** *really* expects you to achieve?	PASPM PASPM	-	PASPM132 PASPM133	Numeric/Integer	1=Leave school as soon as possible 2=Finish high school, or as much high school as possible 3=Finish high school, plus some further education… 4=At least some university 5=Graduate from university with a general degree… 6=Graduate from university with a degree from professional faculty… 7=Graduate from university with a postgraduate… 9=Missing Value
What job or occupation do you think your **mother** would like you to have, if at all possible, when you are about 25 years old? What job or occupation do you think your **mother**	PASPM PASPM	-	PASPM134 PASPM135	String	-

really expects you to have when you are about 25 years old?					
How much education do you think your **father** would like you to achieve, if at all possible? How much education do you think your **father** *really* expects you to achieve?	PASPF PASPF	-	PASPF143 PASPF144	Numeric/Integer	1=Leave school as soon as possible 2=Finish high school, or as much high school as possible 3=Finish high school, plus some further education… 4=At least some university 5=Graduate from university with a general degree… 6=Graduate from university with a degree from professional faculty… 7=Graduate from university with a postgraduate… 9=Missing Value
What job or occupation do you think your **father** would like you to have, if at all possible, when you are about 25 years old? What job or occupation do you think your **father** *really* expects you to have when you are about 25 years old?	PASPF PASPF	-	PASPF145 PASPF146	String	-
Do you have a computer at home?	COWN	-	COWN147	Numeric/Integer	1=Yes 0=No 9=Missing value
Do you have a good access to computers at school?	ACCS	-	ACCS148	Numeric/Integer	1=Yes 0=No 9=Missing value
If you answered "no" to Question 147, where do you get access to a computer aside from school? [Tick all that apply]	NOCOM	-	NOCOM149	Numeric/Integer	Internet Café 1= Yes 0=No Friend's computer 1=Yes 0=No Others 1=Yes 0=No 9=Missing Value
What do you use the computer for?	USE4	-	USE4150	Numeric/Integer	Schoolwork Internet/email/chat Playing games Playing MP3s and Videos Programming Others

					1=Yes 0=No 9=Missing
Your frequency of computer use	FREQ	-	FREQ151	Numeric/Integer	1=Never 2=Occasionally 3=Quite frequently 4=Daily 9=Missing value
Your beliefs, feelings and behaviours in relation to computers -Affective -Behavioural -Cognitive	AFFC	CompAFFC	AFFC152 AFFC152R AFFC155 AFFC155R AFFC158 AFFC158R AFFC160 AFFC163 AFFC163R AFFC166 AFFC166R AFFC169 AFFC169R AFFC172 AFFC172R AFFC174 AFFC174R AFFC176 AFFC176R AFFC182 AFFC182R AFFC183 AFFC183R	Numeric/Integer	From **1** (Strongly disagree) to **5** (Strongly agree) *For all recoded items (Item numbers with "R"):* From **5** (Strongly disagree) to **1** (Strongly agree) 9=Missing value
	BEHV	CompBEHV	BEHV154 BEHV157 BEHV159 BEHV162 BEHV165 BEHV168 BEHV171 BEHV173 BEHV175 BEHV178		
	COGN	CompCOGN	COGN153 COGN153R COGN156 COGN156R COGN161 COGN161R COGN164 COGN164R COGN167 COGN167R COGN170 COGN177 COGN177R COGN179 COGN179R COGN180 COGN180R COGN181 COGN181R		

Appendix C

The Students' Uptake of Physics Study Questionnaire for Physics Teachers (South Australia version)

THE UNIVERSITY OF ADELAIDE
AUSTRALIA

SUB CRUCE LUMEN

SCHOOL OF EDUCATION

STUDENTS' UPTAKE OF PHYSICS
STUDY QUESTIONNAIRE

(For teachers/lecturers in South Australian schools/universities)

A project by:
Mr. Francisco L. Ben
PhD Candidate, School of Education
The University of Adelaide

Supervisors:
Dr. Siva Alagumalai
Dr. Chris Dawson
Dr. I Gusti Darmawan

Students' Uptake of Physics STUDY QUESTIONNAIRE

Please read each question carefully and answer as accurately as you can. The questions/items pertain to your experiences and insights about teaching physics and your school's/university's physics curriculum. For this questionnaire, you will answer items by <ticking> a box and writing down a short answer.

If you make a mistake in your answer, simply cross out your error and mark/encircle the correct answer. If you make an error when writing an answer, simply cross it out and write the correct answer next to it.

In this questionnaire, there are no "right" or "wrong" answers. Your answers should be the ones that you think are "right" for you.

You may ask for help if you do not understand something nor are not sure how to answer a question.

Your answers will be combined with others to make totals and averages in which no individual can be identified. <u>All your answers and your identity will be kept strictly confidential</u>.

Your time and effort completing this questionnaire is greatly appreciated.

Thank you.

Teacher/lecturer I.D.:

Teacher/lecturer Name:

School/University Name:

Degree completed:

Major/Area of specialisation:

(Physics) Trainings/seminars attended (You may attach a separate sheet of paper if required):

GENERAL INFORMATION ABOUT YOUR TEACHING EXPERIENCE, QUALIFICATIONS, AND PERCEPTIONS OF THE PHYSICS CURRICULUM IN YOUR SCHOOL/UNIVERSITY.

1. Subject(s) taught
2. Certified? ☐ Yes ☐ No ☐ Not applicable
3. Certification
4. Years of physics teaching experience
5. Total years of teaching experience

6. Are you comfortable teaching physics?

☐ Yes ☐ No

Why?

7. What are your perceptions of the physics curriculum at your school/university?

8. How do you promote physics at your school/university? How do you encourage students to study physics?

THANK YOU FOR YOUR TIME

Appendix D

The Students' Uptake of Physics Study Questionnaire for Physics Teachers (Philippines version)

THE UNIVERSITY OF ADELAIDE
AUSTRALIA

SUB CRUCE LUMEN

SCHOOL OF EDUCATION

STUDENTS' UPTAKE OF PHYSICS
STUDY QUESTIONNAIRE

(For teachers/lecturers in Philippine schools/universities)

A project by:

Mr. Francisco L. Ben
School of Education
The University of Adelaide

Supervised by:
Dr. Sivakumar Alagumalai
Assoc. Prof. Chris Dawson
Dr. Darmawan I Gusti

Students' Uptake of Physics STUDY QUESTIONNAIRE

Please read each question carefully and answer as accurately as you can. The questions/items pertain to your experiences and insights about teaching physics and your school's/university's physics curriculum. For this questionnaire, you will answer items by <ticking> a box and writing down a short answer.

If you make a mistake in your answer, simply cross out your error and mark/encircle the correct answer. If you make an error when writing an answer, simply cross it out and write the correct answer next to it.

In this questionnaire, there are no "right" or "wrong" answers. Your answers should be the ones that you think are "right" for you.

You may ask for help if you do not understand something or are not sure how to answer a question.

Your answers will be combined with others to make totals and averages in which no individual can be identified. <u>All your answers and your identity will be kept strictly confidential</u>.

Your time and effort completing this questionnaire is greatly appreciated.

Thank you.

Teacher/lecturer I.D.:

Teacher/lecturer Name:

School/University Name:

Degree completed:

Major/Area of specialisation:

(Physics) Trainings/seminars attended (please include dates):

GENERAL INFORMATION ABOUT YOUR TEACHING EXPERIENCE, QUALIFICATIONS, AND PERCEPTIONS OF THE PHYSICS CURRICULUM IN YOUR SCHOOL/UNIVERSITY.

1. Subject(s) taught
2. Certified? ☐ Yes ☐ No ☐ Not applicable
3. Certification
4. Years of physics teaching experience
5. Total years of teaching experience

6. Are you comfortable teaching physics?

☐ Yes ☐ No

Why?

7. What are your perceptions of the physics curriculum at your school/university?

8. How do you promote physics at your school/university? How do you encourage students to study physics?

THANK YOU FOR YOUR TIME

Appendix E

Participant Information Sheet
Consent Forms for Participation - Students
Complaints Form
Letter to Parents
Sample Letters of Request for Schools/Institutions

THE UNIVERSITY OF ADELAIDE
AUSTRALIA

School of Education

245 North Terrace, Adelaide SA 5005; Tel: (08) 8303 5628, Fax: (08) 8303 3604

RESEARCH PROJECT INFORMATION SHEET

(For students in South Australia)

I am Francisco L. Ben, a PhD student in the School of Education at the University of Adelaide. I am presently undertaking research leading to the production of thesis on the subject **Students' uptake of physics: a study of South Australian and Filipino students**.

You will be asked to complete a questionnaire in the specified timeframes during your homeroom class:

- Students' Uptake of Physics Study Questionnaire (with approximate time allocation for each section shown)
  - *General Information* items - 5 minutes
  - Items about *Motivation* - 10 minutes
  - Items about *Self-esteem* - 3 minutes
  - Items about *Classroom Climate* - 10 minutes
  - Items about *Attitudes Toward Physics* - 3 minutes
  - Items about *Parents' Aspirations* - 5 minutes
  - Items about *Computer Use and Access* - 10 minutes

Completion of the questionnaires will be divided into three daily sessions (approximately 15 minutes each) during your homeroom class during the First Term of the school year.

Questionnaires will be collected by the teacher about 5 minutes before homeroom class ends.

The main goal of this research is to examine the declining interest and participation of senior secondary and tertiary students in physics, which is a growing concern in many countries. It specifically aims to identify different factors that may play key roles in influencing students' interest and participation in physics. This project is intended to further the research that has already been conducted on this topic, but from Australian and Filipino perspectives.

From this project I hope to develop a causal model of the different factors that may have an influence on students' choice to study physics in senior high school and university levels. These factors can be divided into three broad groups: individual reasons, family influences, and school influences. Any one or combinations of these factors could provide useful information on how they affect students' motivation to study this seemingly "dreadfully hard and boring" field of the sciences. If successful, results from this study should provide both educationalists and policy makers a significant amount of useful information and a deeper understanding of students' declining interest in physics.

Be assured that any information provided will be treated in the strictest confidence and neither you, nor your school, will be individually identifiable in the resulting thesis, report or other publications. You are, of course, entirely free to discontinue your participation at any time or to decline to answer particular questions in the study. Since participation is purely voluntary, non-participation will not affect your academic progress in any way.

In this project, I intend to make a recording of any student or teacher interviews. Therefore, I will seek the consent of the students and parents of students (who are under 18 years old), and

teachers to record the interview, to use the recording or a transcription in preparing the thesis, report or other publications, on condition that names or identities are not revealed.

Should you require additional information regarding this research, please contact me by telephone on (08) 8303-7196, mobile 0421-843-090, or email francisco.ben@adelaide.edu.au. Should I be unavailable, my supervisor, Dr. Sivakumar Alagumalai, can also be contacted at the address and telephone given above or at (08) 8303-5630 and email sivakumar.alagumalai@adelaide.edu.au.

Please see the attached independent complaints procedure form should you have any complaints about this project.

Thank you for considering this request.

Sincerely yours,

Francisco L. Ben

THE UNIVERSITY OF ADELAIDE AUSTRALIA

School of Education

245 North Terrace, Adelaide SA 5005; Tel: (+618) 8303 5628, Fax: (+618) 8303 3604

RESEARCH PROJECT INFORMATION SHEET

(For physics students in the Philippines)

I am Francisco L. Ben, a research scholar in the School of Education at the University of Adelaide. I am presently undertaking research leading to the production of thesis on the subject **Students' uptake of physics: a study of South Australian and Filipino students**.

You will be asked to complete a questionnaire in the specified timeframes during your homeroom class:

- Students' Uptake of Physics Study Questionnaire (with approximate time allocation for each section shown)
  - *General Information* items - 5 minutes
  - Items about *Motivation* - 10 minutes
  - Items about *Self-esteem* - 3 minutes
  - Items about *Classroom Climate* - 10 minutes
  - Items about *Attitudes Toward Physics* - 3 minutes
  - Items about *Parents' Aspirations* - 5 minutes
  - Items about *Computer Use and Access* - 10 minutes

Completion of the questionnaires will be divided into three daily sessions (approximately 15 minutes each) during your homeroom class during the Second Grading Period of the school year.

Questionnaires will be collected by the teacher about 5 minutes before homeroom class ends.

NOTE: If completing the questionnaire during homeroom time is not possible, you can take the questionnaire home with you but please make sure you complete and return it to your physics teacher <u>within 3 days</u>.

The main goal of this research is to examine the declining interest and participation of senior secondary and tertiary students in physics, which is a growing concern in many countries. It specifically aims to identify different factors that may play key roles in influencing students' interest and participation in physics. This project is intended to further the research that has already been conducted on this topic, but from Australian and Filipino perspectives.

From this project I hope to develop a causal model of the different factors that may have an influence on students' choice to study physics in senior high school and university levels. These factors can be divided into three broad groups: individual reasons, family influences, and school influences. Any one or combinations of these factors could provide useful information on how they affect students' motivation to study this seemingly "dreadfully hard and boring" field of the sciences. If successful, results from this study should provide both educationalists and policy makers a significant amount of useful information and a deeper understanding of students' declining interest in physics.

Be assured that any information provided will be treated in the strictest confidence and neither participants nor schools will be individually identifiable in the resulting thesis, report or other publications. Participants are, of course, entirely free to discontinue their participation at any time or to decline to answer particular questions in the study. Since participation is purely voluntary, non-participation will not affect students' academic progress in any way.

In this project, I intend to make a recording of any student or teacher interviews (if needed). Therefore, I will seek the consent of the students and parents of students (who are under 18 years old), and teachers to record the interview, to use the recording or a transcription in preparing the thesis, report or other publications, on condition that names or identities are not revealed.

Should you require additional information regarding this research, please contact me by telephone on (+618) 8303-7196, mobile (+61)421-843-090, or email francisco.ben@adelaide.edu.au. Should I be unavailable, my supervisor, Dr. Sivakumar Alagumalai, can also be contacted at the address and telephone given above or at (+618) 8303-5630 and email sivakumar.alagumalai@adelaide.edu.au.

Please see the attached independent complaints procedure form should you have any complaints about this project.

Thank you for considering this request.

Signed,

Francisco L. Ben

THE UNIVERSITY OF ADELAIDE AUSTRALIA

School of Education

245 North Terrace, Adelaide SA 5005; Tel: (08) 8303 5628, Fax: (08) 8303 3604

RESEARCH PROJECT INFORMATION SHEET
(For teachers in South Australia)

I am Francisco L. Ben, a PhD student in the School of Education at the University of Adelaide. I am presently undertaking research leading to the production of thesis on the subject **Students' uptake of physics: a study of South Australian and Filipino students**.

You will be asked to complete a questionnaire in the specified timeframes during your homeroom class (Term 1):

- Students' Uptake of Physics Study Questionnaire (with approximate time allocation for each section shown)
  - General information about your teaching experience, qualifications, and perceptions of the physics curriculum in your school.
    - 10 to 15 minutes

- Interviews about physics teaching methods and practices (*this will only happen when the need for more comprehensive data on perception of physics arises – can happen at least a week after administering the questionnaire completion task*) - 20 to 30 minutes after school hours at school

Please collect all the questionnaires (including the one you filled-out) about 5 minutes before homeroom class ends.

The main goal of this research is to examine the declining interest and participation of senior secondary and tertiary students in physics, which is a growing concern in many countries. It specifically aims to identify different factors that may play key roles in influencing students' interest and participation in physics. This project is intended to further the research that has already been conducted on this topic, but from Australian and Filipino perspectives.

From this project I hope to develop a causal model of the different factors that may have an influence on students' choice to study physics in senior high school and university levels. These factors can be divided into three broad groups: individual reasons, family influences, and school influences. Any one or combinations of these factors could provide useful information on how they affect students' motivation to study this seemingly "dreadfully hard and boring" field of the sciences. If successful, results from this study should provide both educationalists and policy makers a significant amount of useful information and a deeper understanding of students' declining interest in physics.

Be assured that any information provided will be treated in the strictest confidence and no participant or school will be individually identifiable in the resulting thesis, report or other publications. Participants are, of course, entirely free to discontinue their participation at any time or to decline to answer particular questions in the study. Since participation is purely voluntary, non-participation will not affect students' academic progress in any way

In this project, I intend to make an audio recording of any student or physics teacher interviews. Therefore, I will seek the consent of the selected students and parents of students (who are under 18 years old), and selected physics teachers to record the interview, to use the recording or a transcription in preparing the thesis, report or other publications, on condition that names or identities are not revealed.

Should you require additional information regarding this research, please contact me by telephone on (08) 8303-7196, mobile 0421-843-090, or email francisco.ben@adelaide.edu.au. Should I be unavailable, my supervisor, Dr. Sivakumar Alagumalai, can also be contacted at the address and telephone given above or at (08) 8303-5630 and email sivakumar.alagumalai@adelaide.edu.au.

Please see the attached independent complaints procedure form should you have any complaints about this project.

Thank you for considering this request.

Sincerely yours,

Francisco L. Ben

THE UNIVERSITY OF ADELAIDE AUSTRALIA

School of Education

245 North Terrace, Adelaide SA 5005; Tel: (+618) 8303 5628, Fax: (+618) 8303 3604

RESEARCH PROJECT INFORMATION SHEET

(For physics teachers in the Philippines)

I am Francisco L. Ben, a research scholar in the School of Education at the University of Adelaide. I am presently undertaking research leading to the production of thesis on the subject **Students' uptake of physics: a study of South Australian and Filipino students**.

You will be asked to complete a questionnaire in the specified timeframes during your homeroom class (Second Grading Period):

- Students' Uptake of Physics Study Questionnaire (with approximate time allocation for each section shown)
  - General information about your teaching experience, qualifications, and perceptions of the physics curriculum in your school.
    - 20 to 25 minutes

- Interviews about physics teaching methods and practices (*this will only happen when the need for more comprehensive data on perception of physics arises – can happen at least a week after administering the questionnaire completion task*) - 20 to 30 minutes after school hours at school

Please collect all the questionnaires (including the one you filled-out) about 5 minutes before homeroom class ends.

If completing the questionnaire is not possible at school, you can let selected student participants to take the questionnaire home with them but please remind them to complete and return it to you preferably within 3 days.

The main goal of this research is to examine the declining interest and participation of senior secondary and tertiary students in physics, which is a growing concern in many countries. It specifically aims to identify different factors that may play key roles in influencing students' interest and participation in physics. This project is intended to further the research that has already been conducted on this topic, but from Australian and Filipino perspectives.

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Be assured that any information provided will be treated in the strictest confidence and neither participants nor schools will be individually identifiable in the resulting thesis, report or other publications. Participants are, of course, entirely free to discontinue their participation at any time or to decline to answer particular questions in the study. Since participation is purely voluntary, non-participation will not affect students' academic progress in any way

In this project, I intend to make a recording of any student or physics teacher interviews. Therefore, I will seek the consent of the selected students and parents of students (who are under 18 years old), and selected physics teachers to record the interview, to use the recording or a transcription in preparing the thesis, report or other publications, on condition that names or identities are not revealed.

Should you require additional information regarding this research, please contact me by telephone on (+618) 8303-7196, mobile (+61) 421-843-090, or email francisco.ben@adelaide.edu.au. Should I be unavailable, my supervisor, Dr. Sivakumar Alagumalai, can also be contacted at the address and telephone given above or at (+618) 8303-5630 and email sivakumar.alagumalai@adelaide.edu.au.

Please see the attached independent complaints procedure form should you have any complaints about this project.

Thank you for considering this request.

Signed,

Francisco L. Ben

THE UNIVERSITY OF ADELAIDE HUMAN RESEARCH ETHICS COMMITTEE

STANDARD CONSENT FORM
For Research to be Undertaken on a Child, and those in Dependant Relationships or Comparable Situations
To be Completed by Parent or Guardian

1. I, ……*(please print name)*

   consent to allow ……...*(please print name)*

   to take part in the research project entitled:

   "Students' uptake of physics: A study of South Australian and Filipino students"

2. I acknowledge that I have read the attached Information Sheet entitled:

   Research Project Information Sheet (for students in South Australia)

   and have had the project, as far as it affects ……*(name)* fully explained to me by the research worker. My consent is given freely.

   IN ADDITION, I ACKNOWLEDGE THE FOLLOWING ON BEHALF OF

   ……*(name)*

3. Although I understand that the purpose of this research project is to improve the quality of physics education, it has also been explained to me that involvement may not be of any benefit to him/her.

4. I have been given the opportunity to have a member of his/her family or friend present while the project was explained to me.

5. I have been informed that the information he/she provides will be kept confidential.

6. In case interviews will be needed, I understand that they will be audio recorded.

7. I understand that he/she is free to withdraw from the project at any time and that this will not affect his/her academic progress, now or in the future.

8. I am aware that I should retain a copy of this Consent Form, when completed, and the attached Information Sheet.

   ……Parent/Guardian……
   …
   (signature and please indicate relationship) *(date)*

WITNESS

I have described to ……*(name of parent/guardian)*

the nature of the research to be carried out. In my opinion she/he understood the explanation.

Status in Project**:** ……..

Name: ……..……

……
(signature) *(date)*

THE UNIVERSITY OF ADELAIDE HUMAN RESEARCH ETHICS COMMITTEE

STANDARD CONSENT FORM
FOR PEOPLE WHO ARE PARTICIPANTS IN A RESEARCH PROJECT
(for students over 18)

1. I, ……*(please print name)*

   consent to take part in the research project entitled:

   "Students' uptake of physics: A study of South Australian and Filipino students"

2. I acknowledge that I have read the attached Information Sheet entitled:

   Research Project Information Sheet (for students in South Australia)

3. I have had the project, so far as it affects me, fully explained to my satisfaction by the research worker. My consent is given freely.

4. Although I understand that the purpose of this research project is to improve the quality of physics education, it has also been explained that my involvement may not be of any benefit to me.

5. I have been given the opportunity to have a member of my family or a friend present while the project was explained to me.

6. I have been informed that, while information gained during the study may be published, I will not be identified and my personal results will not be divulged.

7. In case an interview is needed, I understand that it will be audio recorded.

8. I understand that I am free to withdraw from the project at any time and that this will not affect my academic progress, now or in the future.

9. I am aware that I should retain a copy of this Consent Form, when completed, and the attached Information Sheet.

……...
(signature) *(date)*

WITNESS

I have described to ……..*(name of subject)*

the nature of the research to be carried out. In my opinion she/he understood the explanation.

Status in Project**:** …….

Name: ……..….

……...
(signature) *(date)*

STANDARD CONSENT FORM
For Research to be Undertaken on a Child, and those in Dependant Relationships or Comparable Situations
To be Completed by Parent or Guardian

1. I, ……..…. *(please print name)*

consent to allow ……... *(please print name)*

to take part in the research project entitled:

"Students' uptake of physics: A study of South Australian and Filipino students"

3. I acknowledge that I have read the attached Information Sheet entitled:

Research Project Information Sheet (for physics students in the Philippines)

and have had the project, as far as it affects ……*(name)* fully explained to me by the research worker. My consent is given freely.

IN ADDITION, I ACKNOWLEDGE THE FOLLOWING ON BEHALF OF

…….*(name)*

3. Although I understand that the purpose of this research project is to improve the quality of physics education, it has also been explained to me that involvement may not be of any benefit to him/her.

4. I have been informed that the information he/she provides will be kept confidential.

5. In case interviews will be needed, I understand that they will be audio recorded.

6. I understand that he/she is free to withdraw from the project at any time and that this will not affect his/her academic progress, now or in the future.

7. I am aware that I should retain a copy of this Consent Form, when completed, and the attached Information Sheet.

……Parent/Guardian……
(signature and please indicate relationship) *(date)*

----------Lower portion to be returned to Physics teacher

CONSENT SLIP

I **agree**/**do not agree** for ……*(name of child)* to participate in this research endeavour **"Students' uptake of physics: A study of South Australian and Filipino students"**. I understand that my child's participation / non-participation to this project will not affect his/her academic progress, now or in the future.

Name of child: ……. Signature…….. Date……

Name of parent:…… Signature…….. Date……

STANDARD CONSENT FORM
FOR PEOPLE WHO ARE PARTICIPANTS IN A RESEARCH PROJECT
(for students over 18)

1. I, ……*(please print name)*

   consent to take part in the research project entitled:

   "Students' uptake of physics: A study of South Australian and Filipino students"

2. I acknowledge that I have read the attached Information Sheet entitled:

   Research Project Information Sheet (for physics students in the Philippines)

3. I have had the project, so far as it affects me, fully explained to my satisfaction by the research worker. My consent is given freely.

4. Although I understand that the purpose of this research project is to improve the quality of physics education, it has also been explained that my involvement may not be of any benefit to me.

5. I have been informed that, while information gained during the study may be published, I will not be identified and my personal results will not be divulged.

6. In case an interview is needed, I understand that it will be audio recorded.

7. I understand that I am free to withdraw from the project at any time and that this will not affect my academic progress, now or in the future.

8. I am aware that I should retain a copy of this Consent Form, when completed, and the attached Information Sheet.

……...
(signature) *(date)*

WITNESS

I have described to ……..*(name of subject)*

the nature of the research to be carried out. In my opinion she/he understood the explanation.

Status in Project**:** …….

Name: ……..….

……...
(signature) *(date)*

STANDARD CONSENT FORM
FOR PEOPLE WHO ARE PARTICIPANTS IN A RESEARCH PROJECT
(for teachers in South Australia)

1. I, ……*(please print name)*

   consent to take part in the research project entitled:

   "Students' uptake of physics: A study of South Australian and Filipino students"

2. I acknowledge that I have read the attached Information Sheet entitled:

   Research Project Information Sheet (for teachers in South Australia)

3. I have had the project, so far as it affects me, fully explained to my satisfaction by the research worker. My consent is given freely.

4. Although I understand that the purpose of this research project is to improve the quality of physics education, it has also been explained that my involvement may not be of any benefit to me.

5. I have been given the opportunity to have a member of my family or a friend present while the project was explained to me.

6. I have been informed that, while information gained during the study may be published, I will not be identified and my personal results will not be divulged.

7. In case an interview is needed, I understand that it will be audio recorded.

8. I understand that I am free to withdraw from the project at any time and that this will not affect my professional progress, now or in the future.

9. I am aware that I should retain a copy of this Consent Form, when completed, and the attached Information Sheet.

……...
(signature) *(date)*

WITNESS

I have described to ……..*(name of subject)* of

…….. *(name of institution or school)*
the nature of the research to be carried out. In my opinion she/he understood the explanation.
Status in Project**:** ……

Name: ……..….

……...
(signature) *(date)*

THE UNIVERSITY OF ADELAIDE
AUSTRALIA

STANDARD CONSENT FORM
FOR PEOPLE WHO ARE PARTICIPANTS IN A RESEARCH PROJECT
(for physics teachers in the Philippines)

1. I, ……*(please print name)*

   consent to take part in the research project entitled:

   "Students' uptake of physics: A study of South Australian and Filipino students"

2. I acknowledge that I have read the attached Information Sheet entitled:

   Research Project Information Sheet (for physics teachers in the Philippines)

3. I have had the project, so far as it affects me, fully explained to my satisfaction by the research worker. My consent is given freely.

4. Although I understand that the purpose of this research project is to improve the quality of physics education, it has also been explained that my involvement may not be of any benefit to me.

5. I have been informed that, while information gained during the study may be published, I will not be identified and my personal results will not be divulged.

6. In case an interview is needed, I understand that it will be audio recorded.

7. I understand that I am free to withdraw from the project at any time and that this will not affect my professional progress, now or in the future.

8. I am aware that I should retain a copy of this Consent Form, when completed, and the attached Information Sheet.

……...
(signature) *(date)*

WITNESS

I have described to ……..*(name of subject)* of

…….. *(name of institution/school)*
the nature of the research to be carried out. In my opinion she/he understood the explanation.
Status in Project**:** …….

Name: ……..….

……...
(signature) *(date)*

THE UNIVERSITY OF ADELAIDE
HUMAN RESEARCH ETHICS COMMITTEE

Room 661 Wills Building, The University of Adelaide, SA 5005; Tel: (+618) 8303-6028, Fax (+618) 8303-7325

CONTACTS FOR INFORMATION ON PROJECT AND INDEPENDENT COMPLAINTS PROCEDURE

The Human Research Ethics Committee is obliged to monitor approved research projects. In conjunction with other forms of monitoring it is necessary to provide an independent and confidential reporting mechanism to assure quality assurance of the institutional ethics committee system. This is done by providing research participants with an additional avenue for raising concerns regarding the conduct of any research in which they are involved.

The following study has been reviewed and approved by the University of Adelaide Human Research Ethics Committee:

Project title: ***Students' uptake of physics: a study of South Australian and Filipino students***

1. If you have questions or problems associated with the practical aspects of your participation in the project, or wish to raise a concern or complaint about the project, then you should consult the project coordinator:

   Name: Francisco L. Ben (researcher)
   Telephone: (+618) 8303-7196 / (+61)421-843-090
   Email: francisco.ben@adelaide.edu.au

   Name: Dr. Siva Alagumalai (principal supervisor)
   Telephone: (+618) 8303-5630
   Email: sivakumar.alagumalai@adelaide.edu.au

2. If you wish to discuss with an independent person matters related to

   - making a complaint, or
   - raising concerns on the conduct of the project, or
   - the University policy on research involving human participants, or
   - your rights as a participant

   contact the Human Research Ethics Committee's Secretary on phone (+618) 8303-6028.

THE UNIVERSITY OF ADELAIDE AUSTRALIA

School of Education

245 North Terrace, Adelaide SA 5005; Tel: (08) 8303 5628, Fax: (08) 8303 3604

[Date]

Dear Parent/Guardian,

I am Francisco L. Ben, a PhD student in the School of Education at the University of Adelaide. I am presently undertaking research leading to the production of thesis on the subject **Students' uptake of physics: a study of South Australian and Filipino students**. I will produce my student card, which carries a photograph, as proof of my identity.

I would be most grateful if you would grant permissions for your child to assist in this project by completing a questionnaire on "Students' Uptake of Physics". I will be undertaking this research on site at the school during homeroom class times so as to minimize interference with your child's class time.

You child will be asked to complete a questionnaire in the specified timeframes during his/her homeroom class:

- Students' Uptake of Physics Study Questionnaire – 46 minutes (divided into 3 separate day-sessions during homeroom class in Term 3)

Be assured that any information provided will be treated in the strictest confidence and neither participants nor schools will be individually identifiable in the resulting thesis, report or other publications. Participants are, of course, entirely free to discontinue their participation at any time or to decline to answer particular questions in the study. Since participation is purely voluntary, non-participation will not affect students' academic progress in any way

In this project, I intend to make a recording of any student interviews if the need arises. Therefore, I will seek both yours and your child's consent, on the attached forms, to audio-record the interview, to use the recording or a transcription in preparing the thesis, report or other publications, on condition that names or identities are not revealed or disclosed for any reason.

Please note that I have attached a consent form and an information sheet for you to read and complete.

Any additional information regarding this research should be directed to me by telephone on (08) 8303-7196, mobile 0421-843-090, or email francisco.ben@adelaide.edu.au. Should I be unavailable, my supervisor, Dr. Sivakumar Alagumalai, can also be contacted at the address and telephone given above or at (08) 8303-5630 and email sivakumar.alagumalai@adelaide.edu.au.

Please also see the attached independent complaints procedure form should you have any complaints about this project.

This research project has been approved by the University of Adelaide Human Research Ethics Committee. The Secretary of this Committee can be contacted on (08) 8303-6028, fax (08) 8303-7325, email sabine.schreiber@adelaide.edu.au.

Thank you for your attention and assistance.

Sincerely yours,

Francisco L. Ben

THE UNIVERSITY OF ADELAIDE AUSTRALIA

School of Education

245 North Terrace, Adelaide SA 5005; Tel: (+618) 8303 5628, Fax: (+618) 8303 3604

21 August 2007

Dear Parent/Guardian,

I am Francisco L. Ben, a research scholar in the School of Education at the University of Adelaide in Australia. I am presently undertaking research leading to the production of thesis on the subject **Students' uptake of physics: a study of South Australian and Filipino students**. I will produce my school identification card, which carries a photograph, as proof of my identity.

I would be most grateful if you would grant permissions for your child to assist in this project by completing a questionnaire on "Students' Uptake of Physics". I will be undertaking this research on site at the school during homeroom class times so as to minimize interference with your child's class time.

Your child will be asked to complete a questionnaire in the specified timeframes during his/her homeroom class:

- Students' Uptake of Physics Study Questionnaire – 46 minutes (divided into 3 separate day-sessions during homeroom class in the Second Grading Period)

NOTE: ***If completing the questionnaire in homeroom class is not possible, your child will be allowed to take the questionnaire home but please encourage him/her to complete it within reasonable time, say within 3 days, then return it to his/her physics teacher.***

Be assured that any information provided will be treated with confidentiality and not a single participant or school will be individually identifiable in the resulting thesis, report or other publications. Participants are, of course, entirely free to discontinue their participation at any time or to decline to answer particular questions in the study. Since participation is purely voluntary, non-participation will not affect students' academic progress in any way

In this project, I intend to make a recording of any student interviews if the need arises. Therefore, I will seek both yours and your child's consent, on the attached forms, to audio-record the interview, to use the recording or a transcription in preparing the thesis, report or other publications, on condition that names or identities are not revealed or disclosed for any reason.

Please note that I have attached a consent form and an information sheet for you to read and complete.

Any additional information regarding this research should be directed to me by telephone on (+618) 8303-7196, mobile (+61)421-843-090, or email francisco.ben@adelaide.edu.au. Should I be unavailable, my supervisor, Dr. Sivakumar Alagumalai, can also be contacted at the address and telephone given above or at (+618) 8303-5630 and email sivakumar.alagumalai@adelaide.edu.au.

This research project has been approved by the University of Adelaide Human Research Ethics Committee. The Secretary of this Committee can be contacted on (+618) 8303-6028, fax (+618) 8303-7325, email sabine.schreiber@adelaide.edu.au.

Thank you for your attention and assistance.
Sincerely yours,

Francisco L. Ben

THE UNIVERSITY OF ADELAIDE AUSTRALIA

School of Education

245 North Terrace, Adelaide SA 5005; Tel: (08) 8303 5628, Fax: (08) 8303 3604

30 November 2007

To the School Principal

Dear SIR/MADAME:

I am Francisco L. Ben, a PhD student in the School of Education at the University of Adelaide. I am presently undertaking research leading to the production of thesis on the subject **Students' uptake of physics: a study of South Australian and Filipino students**. I will produce my student card, which carries a photograph, as proof of my identity.

I would be most grateful if you would grant permissions for your selected physics teachers and students to assist in this project by completing a questionnaire on "Students' Uptake of Physics". I will be undertaking this research on site at the school during homeroom class times so as to minimize interference with your school's core class times.

Students will be asked to complete a questionnaire in the specified timeframes during their homeroom class:

- Students' Uptake of Physics Study Questionnaire – 46 minutes (divided into 3 separate day-sessions during homeroom class in Term 1)
-

(If the above time allocation is not possible, please suggest a most appropriate time for me to undertake this survey at your school.)

At the same time, a teachers' version of the questionnaire will be completed by selected physics teachers. Teachers should be able to complete the questionnaire in 10 to 15 minutes. If the need arises a short interview with those selected physics teachers will be carried out a few weeks after. The interview will touch upon certain aspects of the topic.

Be assured that any information provided will be treated in the strictest confidence and no participant or school will be individually identifiable in the resulting thesis, report or other publications. Participants are, of course, entirely free to discontinue their participation at any time or to decline to answer particular questions in the study. Since participation is purely voluntary, non-participation will not affect students' academic progress or the teachers' professional progress in any way

In this project, I intend to make an audio recording of any physics teacher interviews if the need arises. Therefore, I will seek your selected physics teachers' consent, on the attached forms, to audio-record the interview, to use the recording or a transcription in preparing the thesis, report or other publications, on condition that names or identities are not revealed or disclosed for any reason.

Please note that I have attached a consent form and an information sheet for your reference.

Any additional information regarding this research should be directed to me by telephone on (08) 8303-7196, mobile 0421-843-090, or email francisco.ben@adelaide.edu.au. Should I be unavailable, my supervisor, Dr. Sivakumar Alagumalai, can also be contacted at the address and telephone given above or at (08) 8303-5630 and email sivakumar.alagumalai@adelaide.edu.au.

Please also see the attached independent complaints procedure form should your teachers or students have any complaints about this project.

This research project has been approved by the University of Adelaide Human Research Ethics Committee. The Secretary of this Committee can be contacted on (08) 8303-6028, fax (08) 8303-7325, email sabine.schreiber@adelaide.edu.au.

Thank you for your attention and assistance.

Sincerely yours,

Francisco L. Ben

THE UNIVERSITY OF ADELAIDE
AUSTRALIA

School of Education

245 North Terrace, Adelaide SA 5005; Tel: (08) 8303 5628, Fax: (08) 8303 3604

22 May 2007

Allan Dooley
Director
Catholic Education Offices
116 George Street
Thebarton SA 5031

Dear SIR:

I am a PhD student in the School of Education at the University of Adelaide. I am presently undertaking research leading to the production of thesis on the subject **Students' uptake of physics: a study of South Australian and Filipino students**.

The main goal of this research is to examine the declining interest and participation of senior secondary and tertiary students in physics, which is a growing concern in many countries. It specifically aims to identify different factors that may play key roles in influencing students' interest and participation in physics. This project is intended to further the research that has already been conducted on this topic, but from Australian and Filipino perspectives. Results from this study should provide both educationalists and policy makers a significant amount of useful information and a deeper understanding of students' declining interest in physics.

In this regard, I would like to seek permission from your office to conduct some data gathering using a survey questionnaire at some of your Senior Secondary Schools here in the Adelaide Metro area. Samples will come from randomly selected Year 12 physics students and physics teachers. If granted permission, letters will be sent to the principals of these schools to seek permission/agreement to proceed with this research at their site. Any information provided will be treated in the strictest confidence and neither participants nor schools will be individually identifiable in the resulting thesis, report or other publications. Participants are, of course, entirely free to discontinue their participation at any time or to decline to answer particular questions in the study. Since participation is purely voluntary, non-participation will not affect students' academic progress or the teachers' professional progress in any way

Once approval has been given at the local level, I will ensure to fulfil my responsibilities in obtaining informed consent, that individuals' confidentiality is preserved, and that safety precautions are in place. I will also provide feedback to sites I will use in my research. In addition, to ensure maximum benefits to Catholic Education, I will supply the department with a copy of the final report, which can be circulated to interested staff and then made available to educators for future reference.

Any additional information regarding this research should be directed to me by telephone on (08) 8303-7196, mobile 0421-843-090, or email francisco.ben@adelaide.edu.au. Should I be unavailable, my supervisor, Dr. Sivakumar

Alagumalai, can also be contacted at the address and telephone given above or at (08) 8303-5630 and email sivakumar.alagumalai@adelaide.edu.au.

I have attached to this letter copy of the questionnaires (for both students and teachers) I am going to use for my survey. Please also see the attached independent complaints procedure form should your teachers or students have any complaints about this project. Also included are consent forms and participant information sheet to be given to both students and teachers.

This research project has been approved by the University of Adelaide Human Research Ethics Committee (No. H-135-2006). The Secretary of this Committee can be contacted on (08) 8303-6028, fax (08) 8303-7325, email sabine.schreiber@adelaide.edu.au. It has also been approved by the Department of Education and Children's Services (see attached document).

Thank you for your attention and assistance.

Sincerely yours,

Francisco L. Ben

THE UNIVERSITY OF ADELAIDE
AUSTRALIA

School of Education

245 North Terrace, Adelaide SA 5005; Tel: (+618) 8303 5628, Fax: (+618) 8303 3604

22 August 2007

Dr. Arnel Salvador
Director
National Institute of Physics
University of the Philippines
Diliman, Quezon City
Philippines

[*Please note that this is just a follow-up version of the letter I sent through fax a few months ago*]

Dear Dr. Salvador:

I am Francisco L. Ben, a Doctoral scholar in the School of Education at the University of Adelaide in Australia. I am presently undertaking research leading to the production of thesis on the subject **Students' uptake of physics: a study of South Australian and Filipino students**. When I visit your school/department in the Philippines I will produce my University of Adelaide identity card, which carries a photograph, as proof of my identity.

I would be most grateful if you would grant permissions for your selected physics teachers/instructors and 1st Year University Physics/Applied Physics students to assist in this project by completing a questionnaire on "Students' Uptake of Physics". I intend to conduct my questionnaire survey in August of this year. I will be undertaking this research on site at the school during the first few minutes of class/lecture times so as to minimize interference. Selected students will be asked to complete a questionnaire in the specified timeframes:

- Students' Uptake of Physics Study Questionnaire – 46 minutes (divided into 3 separate day-sessions of around 15 minutes each)

At the same time, a teachers' (or instructor's) version of the questionnaire will be completed by selected physics teachers/instructors. Teachers/instructors should be able to complete the questionnaire in 10 to 15 minutes. If the need arises a short interview with those selected physics teachers/instructors will be carried out a week after. The interview will touch upon certain aspects of the topic.

However, if it is not possible to complete the questionnaires during class times, students and teachers can complete them at home. Prompt return of the completed questionnaires will be appreciated (preferably within 3 days of receipt).

Be assured that any information provided will be treated with strict confidentiality and not a single participant or school will be individually identifiable in the resulting thesis, report or other publications. Participants are, of course, entirely free to discontinue their participation at any time or to decline to answer particular questions in the study. Since participation is purely voluntary, non-participation will not affect students' academic progress or the teachers'/instructor's professional progress in any way

In this project, I intend to make an audio recording of any physics teacher/instructor interviews if the need arises. Therefore, I will seek your selected physics teachers'/instructor's consent, on the attached forms, to audio-record the interview, to use the recording or a transcription in

preparing the thesis, report or other publications, on condition that names or identities are not revealed or disclosed for any reason.

Please note that I have attached a consent form and an information sheet for your reference.

Any additional information regarding this research should be directed to me by telephone on (+618) 8303-7196, mobile (+61)421-843-090, or email francisco.ben@adelaide.edu.au. Should I be unavailable, my supervisor, Dr. Sivakumar Alagumalai, can also be contacted at the address and telephone given above or at (+618) 8303-5630 and email sivakumar.alagumalai@adelaide.edu.au.

Please also see the attached independent complaints procedure form should your teachers or students have any complaints about this project.

This research project has been approved by the University of Adelaide Human Research Ethics Committee. The Secretary of this Committee can be contacted on (+618) 8303-6028, fax (+618) 8303-7325, email sabine.schreiber@adelaide.edu.au.

Thank you for your attention and assistance.

Sincerely yours,

Francisco L. Ben

PS: While I am in the Philippines, you can reach me at 0915-593-8668.

THE UNIVERSITY OF ADELAIDE
AUSTRALIA

School of Education

245 North Terrace, Adelaide SA 5005; Tel: (08) 8303 5628, Fax: (08) 8303 3604

Lexie Mincham
Manager, Networked Learning Community
Department of Education and Children's Services
Education Centre
31 Flinders Street
Adelaide 5000

GPO Box 1152
Adelaide 5001

Dear Ms. Mincham:

I am Francisco L. Ben, a PhD student in the School of Education at the University of Adelaide. I am presently undertaking research leading to the production of thesis on the subject **Students' uptake of physics: a study of South Australian and Filipino students**.

The main goal of this research is to examine the declining interest and participation of senior secondary and tertiary students in physics, which is a growing concern in many countries. It specifically aims to identify different factors that may play key roles in influencing students' interest and participation in physics. This project is intended to further the research that has already been conducted on this topic, but from Australian and Filipino perspectives.

From this project I hope to develop a causal model of the different factors that may have an influence on students' choice to study physics in senior high school and university levels. These factors can be divided into three broad groups: individual reasons, family influences, and school influences. Any one or combinations of these factors could provide useful information on how they affect students' motivation to study this seemingly "dreadfully hard and boring" field of the sciences. If successful, results from this study should provide both educationalists and policy makers a significant amount of useful information and a deeper understanding of students' declining interest in physics.

In this regard, may I request your good office for the approval to conduct this research in selected high schools within the Metro Adelaide area?

Be assured that any information provided will be treated in the strictest confidence and neither participants nor schools will be individually identifiable in the resulting thesis, report or other publications. Participants are, of course, entirely free to discontinue their participation at any time or to decline to answer particular questions in the study.

In this project, I also intend to make an audio recording of any selected student or physics teacher interviews. Therefore, I will seek the consent of the students and parents

of students (who are under 18 years old), and teachers to record the interview, to use the recording or a transcription in preparing the thesis, report or other publications, on condition that names or identities are not revealed.

This research project has been approved by the University of Adelaide Human Research Ethics Committee. The Secretary of this Committee can be contacted on (08) 8303-6028, fax (08) 8303-7325, email sabine.schreiber@adelaide.edu.au.

Should you require additional information regarding this research, please contact me by telephone on (08) 8303-7196, mobile 0421-843-090, or email francisco.ben@adelaide.edu.au. Should I be unavailable, my supervisor, Dr. Sivakumar Alagumalai, can also be contacted at the address and telephone given above or at (08) 8303-5630 and email sivakumar.alagumalai@adelaide.edu.au.

Thank you for considering this request.

Signed,

Francisco L. Ben

THE UNIVERSITY OF ADELAIDE
AUSTRALIA

School of Education

245 North Terrace, Adelaide SA 5005; Tel: (+618) 8303 5628, Fax: (+618) 8303 3604

Dr. Jean C. Tayag
Director IV
Office of Policy, Planning, Research and Information
Commission on Higher Education (CHED)
5th Floor DAP Bldg, San Miguel Ave., Ortigas Center
Pasig City 1600 PHILIPPINES

Dear Dr. Tayag:

I am Francisco L. Ben, a PhD student in the School of Education at the University of Adelaide, South Australia. I am presently undertaking research leading to the production of thesis on the subject **Students' uptake of physics: a study of South Australian and Filipino students**.

The main goal of this research is to examine the declining interest and participation of senior secondary and tertiary students in physics, which is a growing concern in many countries. It specifically aims to identify different factors that may play key roles in influencing students' interest and participation in physics. This project is intended to further the research that has already been conducted on this topic, but from Australian and Filipino perspectives.

From this project I hope to develop a causal model of the different factors that may have an influence on students' choice to study physics in senior high school and university levels. These factors can be divided into three broad groups: individual reasons, family influences, and school influences. Any one or combinations of these factors could provide useful information on how they affect students' motivation to study this seemingly "dreadfully hard and boring" field of the sciences. If successful, results from this study should provide both educationalists and policy makers a significant amount of useful information and a deeper understanding of students' declining interest in physics.

In this regard, may I request your good office for the approval to conduct this research in selected universities with physics degree offerings within the Quezon City area?

Be assured that any information provided will be treated in the strictest confidence and neither participants nor schools/universities will be individually identifiable in the resulting thesis, report or other publications. Participants are, of course, entirely free to discontinue their participation at any time or to decline to answer particular questions in the study.

In this project, I also intend to make an audio recording of any selected physics student or physics instructor interviews. Therefore, I will seek the consent of the selected students and physics instructors to record the interview, to use the recording or a

transcription in preparing the thesis, report or other publications, on condition that names or identities are not revealed.

This research project has been approved by the University of Adelaide Human Research Ethics Committee. The Secretary of this Committee can be contacted on (+618) 8303-6028, fax (+618) 8303-7325, email sabine.schreiber@adelaide.edu.au.

Should you require additional information regarding this research, please contact me by telephone on (+618) 8303-7196, mobile (+61)421-843-090, or email francisco.ben@adelaide.edu.au. Should I be unavailable, my supervisor, Dr. Sivakumar Alagumalai, can also be contacted at the address and telephone given above or at (+618) 8303-5630 and email sivakumar.alagumalai@adelaide.edu.au.

Thank you for considering this request.

Yours truly,

Francisco L. Ben

NOTED:

Dr. Siva Alagumalai
Head
School of Education
The University of Adelaide

THE UNIVERSITY OF ADELAIDE
AUSTRALIA

School of Education

245 North Terrace, Adelaide SA 5005; Tel: (+618) 8303 5628, Fax: (+618) 8303 3604

Dr. Bienvenido C. Villagracia
Chief, Research Division
Department of Education (DepEd)
Meralco Avenue, Corner St. Paul Road
Pasig City 1600 PHILIPPINES

Dear Dr. Villagracia:

I am Francisco L. Ben, a PhD student in the School of Education at the University of Adelaide, South Australia. I am presently undertaking research leading to the production of thesis on the subject **Students' uptake of physics: a study of South Australian and Filipino students**.

The main goal of this research is to examine the declining interest and participation of senior secondary and tertiary students in physics, which is a growing concern in many countries. It specifically aims to identify different factors that may play key roles in influencing students' interest and participation in physics. This project is intended to further the research that has already been conducted on this topic, but from Australian and Filipino perspectives.

From this project I hope to develop a causal model of the different factors that may have an influence on students' choice to study physics in senior high school and university levels. These factors can be divided into three broad groups: individual reasons, family influences, and school influences. Any one or combinations of these factors could provide useful information on how they affect students' motivation to study this seemingly "dreadfully hard and boring" field of the sciences. If successful, results from this study should provide both educationalists and policy makers a significant amount of useful information and a deeper understanding of students' declining interest in physics.

In this regard, may I request your good office for the approval to conduct this research in selected high schools within the Quezon City School District?

Be assured that any information provided will be treated in the strictest confidence and neither participants nor schools will be individually identifiable in the resulting thesis, report or other publications. Participants are, of course, entirely free to discontinue their participation at any time or to decline to answer particular questions in the study.

In this project, I also intend to make an audio recording of any selected student or physics teacher interviews. Therefore, I will seek the consent of the selected students and parents of students (who are under 18 years old), and selected physics teachers to record the interview, to use the recording or a transcription in preparing the thesis, report or other publications, on condition that names or identities are not revealed.

This research project has been approved by the University of Adelaide Human Research Ethics Committee. The Secretary of this Committee can be contacted on (+618) 8303-6028, fax (+618) 8303-7325, email sabine.schreiber@adelaide.edu.au.

Should you require additional information regarding this research, please contact me by telephone on (+618) 8303-7196, mobile (+61)421-843-090, or email francisco.ben@adelaide.edu.au. Should I be unavailable, my supervisor, Dr. Sivakumar Alagumalai, can also be contacted at the address and telephone given above or at (+618) 8303-5630 and email sivakumar.alagumalai@adelaide.edu.au.

Thank you for considering this request.

Yours truly,

Francisco L. Ben

NOTED:

Dr. Siva Alagumalai
Head
School of Education
The University of Adelaide

Appendix F

Teachers' Responses to the SUPSQ Teacher Questionnaire Items 6 - 8

South Australian Teachers

*Response to Question 6: "**Are you comfortable teaching Physics?**"*

Teacher 1

Yes. Because I am familiar with the course; I enjoy teaching Physics; I enjoy Physics.

Teacher 2

YES. I'm very familiar with the course. I enjoy "Physics" as an area of study; in fact I have a "love" for the subject.

Teacher 3

Yes. Because:

- I am good at it; teaching that is.
- I enjoy the beauty of physics.
- Years of experience have given me confidence with the material to be effective and engaging.
- Students enjoy my lesson.
- Students learn in my classroom.

Teacher 4

Yes. Because:

- Knowledge and understanding of curriculum and beyond.
- Experience.
- Qualifications.
- Respect of students.
- Respect of peers and colleagues.

Teacher 5

Yes. Because I enjoy Physics. I enjoy showing students a different way of observing their world.

Teacher 6

Yes. I am enthusiastic about the content and Physics is one of those subjects that don't involve a great deal of rote learning – you can always find a way to 'solve' a Physics problem any number of ways. Any formulae that you might need can always be derived, and although it can be challenging, it's always fun.

Teacher 7

Yes. I enjoy both the subject of Physics and the opportunity to get students excited about Physics. It is a great subject which has relevance to their everyday world and potential to be very important in their careers. Helping students to catch a bit of that excitement and understand that through Physics may come as interesting and exciting future for them makes teaching Physics a great deal of fun and is a real privilege.

Teacher 8

Yes. I am very comfortable teaching Physics. The main reason for me is because I UNDERSTAND Physics, both physically (conceptually) and mathematically. So I can use Maths as a tool in Physics. To me the first step for becoming a successful Physics

teacher is to understand it. Next step is to deliver that understanding. Delivery can be done successfully through explaining concepts clearly. Also, relating physics to daily experiences all the time. If students can relate, they find it easy to understand the ideas. I enjoy learning/teaching Physics. I believe enjoyment is contagious!

Teacher 9
No. This is my first year teaching Year 11 Physics and I have had to spend a large proportion of my time reviewing the work that I present to my class. As we are a small school I am the only Physics teacher so there is no one that I can refer to when I have a problem with an area of the course. This aspect of not being clear on a particular area causes me to be a little apprehensive and uncomfortable at times when teaching some concepts of the Physics course.

Teacher 10
Yes. Because I have a strong interest in the subject and a belief that Physics provides a valuable insight into the nature of the world and beyond we live in. During my time as a secondary teacher I have been fortunate to work with people who have been passionate about Physics, its importance within the main stream curriculum and significance to student future path ways.

Teacher 11
Yes. I know/understand the concepts very well. I am familiar with many techniques that seem successful or ineffective. I have an understanding of many of the difficulties that students generally encounter during the learning of Science/Physics.

Teacher 12
Yes. Because I know the content and beyond. Taught Year 12 for 20 years; Year 11 for 30+ years.

Teacher 13
Yes. I have a good knowledge of the Year 12 course and resources to support the teaching of Physics.

Response to Question 7: ***"What are your perceptions of the physics curriculum at your school/university?"***

Teacher 1
Generally okay. Stage 1 prepares students for Stage 2 Physics. Students in Stage 2 come from a variety of backgrounds so teaching is from basics up.

Teacher 2
It has been filled with task-oriented assignments leaving less time to develop a real conceptual understanding of the topics. The course should be extended to take more than 3 Terms. In fact, I am teaching about 2/3 to ¾ of the course content that I taught students 15 years ago.

Teacher 3
- Year 12 is imposed but interesting, relevant and contextually in its intent and application.
- Yrs 10 and 11 I set the courses and I tailor them to the students and teach.

Teacher 4
- Year 12 syllabus as directed by SSABSA Year 12 Curriculum Statement.
- Year 11 syllabus directed to inform students of the fundamentals required for understanding physics principles in Science and Technology and to provide a solid basis for Year 12 Physics.

Teacher 5
The Year 11 curriculum is quite broad, but we tend to focus our teaching on preparation for Year 12.

Teacher 6
For Year 11 Physics, I think the students could be working conceptually more, but the connections between Physics and Maths also need to be encouraged. The content that is set out in the required text is also a little out of order in terms of how the students learn and what they need to learn first.

Teacher 7
The curriculum is set by SSABSA and there is really little opportunity to teach beyond it. However, it does provide ample scope to provide a good foundation in Physics and a chance to excite students about the possibilities that Physics gives them.

Teacher 8
Excellent! Concepts come first. Maths supports the understanding and formulating the Physics concepts next. Applications of Physics concepts are discussed. I find it usefull to look at fundamental Physics theories first and apply those simple concepts in a more advanced and complicated way next to show how Physics has a great impact on society.

Teacher 9
I have formulated the Yr 11 Physics curriculum and have based it on the text "Physics Key Ideas (Book A and B)", published by the Adelaide Tuition Centre. I believe using this text will prepare the Yr 11 students well for Yr 12 Physics next year.

Teacher 10
I believe the Physics curriculum we offer at our school is both relevant and valued by the students.

Teacher 11
It's a good attempt to try and incorporate all the many educational pedagogies into the learning of Physics within all the many constraints and parameters.

Teacher 12
O.K. Could be more interesting at Year 11, but Year 12 dominates direction.

Teacher 13
- Very good. Pathway is clear Year 10 onwards.
- Very traditional
- Alternative Physics courses would be good.

Response to Question 8: ***"How do you promote physics at your university? How do you encourage students to study physics?"***

Teacher 1
No promotion. Students do physics depending on the counseling they get entering the college. It depends on their aspiration for future study.

Teacher 2
Present the course in a lively and passionate way. Encourage the class and individuals to take up Physics and to continue study in it. Point out career opportunities, etc. Involve Yr 10 students in the "Science and Engineering Challenge".

Teacher 3
- Promotion is by presenting pathways in Years 11 and 12 and to Year 10 before they make subject selections for the coming year.
- When teaching Year 10's I encourage by giving positive reinforcement as to their performance ability. This also encourages resilience and perseverance.
- Promotion is also by word of mouth of students. If they gain success and enjoyment then they will inform students in younger years to take the course.
- Promotion is also by younger students seeing academic success in older students.

Teacher 4
- Community awareness of the fine results achieved by Westminster students in Physics and the T.E.R. scores.
- Make students aware of the higher profile of Physics as a subject.
- Inform students of the relevance of physics to future careers following tertiary education.

Teacher 5
At Year 11 I try to make it as fun as possible, engaging students in demonstrations and activities such as dropping water bombs off our highest building, pulling table cloths out from under crockery, having lengthy discussions about "looking back in time", why we see colour and allowing students to pose their own theories and ask interesting questions.

Teacher 6
Teaching Year 10 General Science, I try to make sure that Physics receives its equal share of the content/outcomes to be covered.
To encourage students to study Physics, I like to think that my enthusiasm for the subject, and the fact that I am a female Physics teacher in an all-girls school, should promote well enough. I also like to remind students of the number of university courses that require Physics as a prerequisite.

Teacher 7
Being excited and enthusiastic about Physics and their learning! Physics is also a pre-requisite in many university courses – e.g. Engineering. We have many students who wish to study Engineering and so we get many students taking Physics in order to take Engineering. I also actively promote careers in Physics and the opportunities here in South Australia, particularly Adelaide – e.g. Photonics.

Teacher 8
I tell my Year 11 students in particular to do Physics in Year 12 for the following reasons:
1. Keep their options more open to do courses in Uni later.
2. Physics gives them a good general understanding of important issues happening in our society, e.g. when you listen to the news about nuclear power, etc., you have a basic understanding of they mean.
3. Physics then helps them to become good decision-makers in some matters (like in the above example).
4. Parts of their curiosity about nature will be satisfied. So Physics will open some doors at them in the future if they want to know more about the fascinating matters like, Space, etc.
5. Physics is challenging. Challenge is good for us!

Teacher 9
Again, this is the first year that Yr 11 Physics has been taught at our school and this is my first year teaching at the school. Thus I am unaware of how students have been encouraged to study Physics.
This year I will endeavour to encourage my Yr 10 students to study Physics in Yr 11 by presenting interesting and applied lessons of Physics to the Yr 10 Science students.

Teacher 10
Physics is a core component of the Science Curriculum. The course we offer relates Physics concepts to the everyday lives of the students. It also provides the background necessary for students to be successful in higher education courses.

Teacher 11
Show them the "magic" of the subject. Show them how Physics changes our lives and how it creates our world.

Teacher 12
- Talk about how and where it is used in outside world.
- Good for their logic.
- Maths support Physics, which supports Maths.

Teacher 13
We have student seminars to make students aware of the subject at counseling times.

Filipino Teachers

*Response to Question 6: "**Are you comfortable teaching Physics?**"*

Teacher 1
Yes. Because teaching Physics is a teaching-learning process.

Teacher 2
Yes. Because in teaching Physics I'm also learning so many things about the natural world inspite of some problems met like lack of instructional materials, seminars, forums and others.

Teacher 3
Yes. Physics is very interesting subject.

Teacher 4
Yes. Physics was my favorite subject when I was in high school and it is really in-line with my course.

Teacher 5
Yes. Ever since I was a student, I always cherished the moments when I finally grasped a Physics concept, either through experimentation or through problem solving. It is because of this that I want to share with my students. Having taught a variety of students from a wide range of backgrounds has helped me to develop skills to be more effective in getting ideas across to them. I never intended to become a teacher, but teaching has led me to a better understanding of Physics and its applications. This, also, is something I want my students to gain.

Teacher 6
Yes. It deals with day to day experiences.

Teacher 7
Yes. I love Physics and the manner by which it permeates all aspects of daily living. Physics is a way of thinking and seeing and feeling the what, how and why of the things around us.

Teacher 8
Yes. It is my experience.

Teacher 9
Yes. I believe I have developed a good sense of how to make students of different backgrounds understand physical concepts.

Teacher 10
Yes. I graduated with a BS Physics degree, so I am inclined to know more about the subject than any other areas.

Teacher 11

Yes. I am comfortable teaching Physics because:

- I know the subjects well having studied them for five years and counting.
- I am doing a hands-on experience of Physics as a way of life and not just a subject/requirement.
- I am well read on the history of Physics (i.e. I know it is a struggle) thus I accept that it is challenging and know how to deal with the challenges.
- I am simply captivated by Physics.
- I love teaching (anything actually).

Teacher 12

Yes. Because I love the subject, and because I have studied various aspects of Physics, both experimental and theoretical, over the years. Furthermore, I am familiar with the methods used to teach college Physics.

Teacher 13

Yes. I enjoy studying and learning about Physics for myself, and I equally enjoy sharing my enthusiasm for the subject to my students.

Teacher 14

Yes. I enjoyed teaching Physics for almost 17 years. As a teacher, you should involve in the teaching learning process. And make sure that you provide the students an understanding of Physics' principles and be able to use them in solving problems by integrating with real life situations.

Teacher 15

Yes. Due to my knowledge in some basic knowledge in Physics and I think practice makes perfect. Because I believe that in solving problems it needs practice, so due to my effort in studying this things on my own it helps boost my confidence in teaching Physics. Aside from that is concepts in Physics are normally encountered in our everyday lives so it is much easier for me to deliver it in front of my class.

Teacher 16

Yes. Because every topic in physics is related to everyday living and it's so common to everybody. The only problem is how to solve different situations using the concept of Physics.

Teacher 17

Yes. I feel comfortable in teaching Physics because I enjoy teaching it. Though I lack materials, I always make it a point to have some improvised materials. But I think it is more enjoyable if my materials are enough since I can't improvize all the materials needed in our experiment.

Teacher 18

Yes. Physics is a very interesting discipline. Side from that, applications of it can be seen around, students can be asked to manipulate objects to verify laws in Physics. However, there are cases where lack of materials interfere in the teaching-learning process. On the other hand this situation also provides a venue to think of possible ways how to come up with the same result.

Teacher 19

Yes. It doesn't require much of memorization of names and dates…only formulas which can be derived.

Physics is practical so students can appreciate it.

Physics can be taught in a unique and fun way.

Response to Question 7: ***"What are your perceptions of the physics curriculum at your school/university?"***

Teacher 1
Physics curriculum helps the students to acquire scientific skills, attitudes and values of curiosity and open-mindedness necessary to analyze and solve daily problems.

Teacher 2
My perception of the matter is that if we have enough tools, instruments, devices, visual aids, seminars, lectures and others, I can say that Physics curriculum in our school will be more enjoyable for our students to think, do and learn about the world around them.

Teacher 3
The Physics curriculum in this school gives a very strong foundation for students who are going to take science related courses in college.

Teacher 4
If only the school will provide us modern and complete equipment/apparatuses for our laboratory I'm sure the subject Physics will love by everyone.

Teacher 5
I feel the Physics curriculum is sufficient, considering what resources are available. I do think, however, that it needs to be constantly monitored and evaluated to allow for changes should developments arise that could improve instructions, as well as if need for adjusting emphasis on certain topics has to be addressed.

Teacher 6
Better than general curriculum in other schools.

Teacher 7
Fundamentally sound but the implementation (and implementors) needs some working on.
Physics education research on assessment should play an important role in the review of curriculum.

Teacher 8
- Adequate
- At par with international standards

Teacher 9
The Physics curriculum we have is fairly comprehensive. I know from experience that all the topics we include are given sufficient time to be discussed thoroughly.

Teacher 10
I think the current curriculum does not provide enough background to the Physics undergraduates. It basically lacks some subjects like Solid State Physics, some areas in Statistical & Quantum Mechanics, & studies on Lasers & Photonics/ other Applie Physics areas.
In addition, I believe the current system is not able to instill enough motivation and training on academic research to its students. I think the students and the institution will

benefit more, and would be more productive and more motivated to do research, if they are trained &/or assigned to advisers/laboratories earlier in the curriculum.

Teacher 11
In a scale of 1 to 10 with 10 being the highest, I give our curriculum 7. I observe that students encounter difficulties partly because the topics and the courses are arranged in awkward ways. This I learned from studies aiming to reform the way Physics is taught. The positive thing is that, our institute regularly revises the curriculum and gives us ample opportunity to be flexible and creative in our teaching.

Teacher 12
It is the bench mark by which all other Physics curricula in other universities are set, but it is woefully behind as compared to Physics curricula in other universities around the world.

Teacher 13
The syllabus for the general Physics courses (Phy 71, 72, 73) are too "composed" so that the material cannot be absorbed by the students at a comfortable pace.
The dominant emphasis here is research not teaching, so teaching is being relegated as a secondary priority.

Teacher 14
As of today, we have applied different value strategies in presenting science values. Our curriculum is still improving and developing, particularly in shaping the sense of awareness and questioning attitude of our students.

Teacher 15
Well I think my perceptions about the Physics curriculum here in our school is not that enhanced because some of our students still have difficulty in understanding the subject matter. Side form that the school doesn't provide us enough training because the person who are attending the seminars are only on selection basis.

Teacher 16
Not so serious about the subject we have no trainings to uplift the usual programs we have right now.

Teacher 17
We are basing our Physics curriculum on DepEd. We don't have our own curriculum. We are not allowed to have our own. We have to follow whatever curriculum DepEd will provide.

Teacher 18
The Physics curriculum in the school is very compressed. Physics is being taken only by fourth year students. It will be better if students will start studying Physics during their third year. There are topics which are not discussed due to lack of time, other meaningful activities are sacrificed due to same reason.

Teacher 19
Just ok. But I think it could be better. There should be more units devoted to hard core Physics subjects.

Response to Question 8: ***"How do you promote physics at your university? How do you encourage students to study physics?"***

Teacher 1
One way to encourage students to study physics is let them do further readings on the concepts and principles taught. Tell them that the technological advances were mostly from Physics' concepts and principles and these advances will help them become aware of the influence of Science upon social change. Explain to them that studying Physics is a worthwhile and challenging pursuit.

Teacher 2
Physics, as part of the fourth year high school curriculum in our school, does not need any promotion but encouragement for the students to study. How? By telling them that by the use of their senses everything in this world involves Physics and through that the students will cite many observations and experiences that will lead them to be optimistic, enthusiastic and more productive learners.

Teacher 3
Focus on applications.
More on hands-on activities.

Teacher 4
Aside from using PowerPoint Presentations/Interactive CD's in computer in my lessons I also integrate sports, art and music for them to appreciate the relevance of Physics in their daily life.

Teacher 5
I try to develop activities where students can enjoy Physics and applying it to common situation. This allows them to be conscious of the preserve of Physics everywhere, and to realize the importance of the study of Physics. One of my aims is to remove the stigma of Physics being a difficult subject: rather that it is one which needs a certain discipline and awareness.

Teacher 6
Good thing for me, students in this school have enough motivation to learn. (This is true for any subjects and not only Physics).

Teacher 7
By the use of active learning techniques:

1. Cooperative problem-solving;
2. Interactive learning approaches;
3. Interactive lecture demonstrations (ILD);
4. Active laboratory activities;
5. Higher-ordered concept mapping;
6. Real time Physics

Teacher 8

- To promote
- To study

Teacher 9
I tell my students at the start of the semester that Physics is easy and fun. I then introduce study skills and analytical techniques that will make things easy for them. I try to relate the lessons to real life examples to help them relate. I also keep the class atmosphere fun.

Teacher 10
Since I am teaching non-computational, conceptual Physics, I make sure to explain the concepts in terms of everyday phenomena. I always point out that the study of Physics will enable them to understand the simplest, the most bizarre, and even the most complicated things/phenomena that they encounter everyday.

Teacher 11
….on promotion of Physics
There is no overt campaign to promote Physics. We do this by trying to do good research and publishing in reputable journals. We believe this is the efficient way to show that wonderful and worthwhile things get done in Physics.

….on encouraging students

- I try to show them that I am proud and working hard as a Physicist i.e. that I do research and that is my life.
- I tell them stories about Physicist and Physics (trivia & history)
- I try to connect their lessons (usually basic) to their daily experience and to the "grand" events in science and technology.

Teacher 12
There is no need to promote it (from my point of view) since the course attracts many scientifically minded students from high schools throughout the country. Furthermore, the reputation of the NIP allows Physics to promote itself here.
As for encouraging students to study Physics, I emphasize the conceptual beauty and technological applications of Physics, and how it relates to their everyday lives.

Teacher 13
1. My personal contribution to Physics so far is to master the care disciplines of the subject so later on I can make genuinely lasting contribution to research.
2. I hope to encourage students to study Physics by demystifying perceived (true or otherwise) difficulties about the subject.

Teacher 14
We always implant to the students' mind that Physics is nit kind of course to be feared of in as much as all things they do involve the principle and laws of Physics. And to encourage them, we make sure that teaching and learning Physics a more interesting and enjoyable adventure for every learner.

Teacher 15
I promote this subject by encouraging my students in studying and I'm trying my best to make the concepts a lot simpler by giving examples that they normally encounter in their everyday lives.

Teacher 16
I just do my job, teach the students well convincing them that Physics is not that difficult as what they think of.
I give them ordinary examples which they are familiar with and they try to let them realize different concepts which could be possible to integrate in given situation.

Teacher 17
Usually, I use to promote Physics by simply telling them that Physics is very important in our daily life. Sometimes, I organize a content on investigatory projects in Physics. I always telling them that without Physics there will be no inventories and innovations. And the technologies that they see now are because of Physics.

Teacher 18
I do promote Physics by connecting concepts in Physics to real life situation. I do allow my students to perform simple magics but actually can be explained by Physics.

Teacher 19
By telling them about anecdotes, trivias, life stories of famous Physicists, I am able to encourage (and motivate) them to study well in Physics. Also, I always make it a point to show them the practical and fun-side of all those Physics concepts and applications.

Appendix G

Student responses to Items 18 and 19 in SUPSQ

Answers to Item #18 and #19: **(South Australian sample)**

Respondent No.	Answers
1	18. Physics opens doors that would help get to jobs in different fields. I think there are jobs in physics and think physicists are respected in the society. 19. Yes. Enjoy the concepts.
2	18. Physics is interesting and I would study it in Uni if I didn't hate maths. But I regard physics jobs highly. 19. I enjoy concepts but not doing maths studies.
3	(No response)
4	19. Yes. It is required in most degree paths.
5	(No response)
6	18. Very much required. 19. Yes. It is what I enjoy.
7	18. Very available due to the amount of engineering courses and demand for engineers. 19. Yes. I'm interested in how physics affects lives.
8	18. Physics is an important feature of engineering. Therefore, many jobs are available that require physics. 19. Yes. I enjoy building/designing structures and want to become an engineer.
9	(No response)
10	18. Physics can be useful when combined with another qualification, ie engineering. 19. I am undecided.
11	18. As a pre-req to engineering it is useful. I don't think there are a lot of jobs in academic physics. It can open up good jobs. 19. No. I want to do medicine.
12	18. Physics provides people with a wide range of options to look through when considering job opportunities. 19. No. Because I have already decided on particular occupation(s) to explore which don't pursue a career in physics.
13	18. Good job availability as it is important for engineering. 19. No. I am pursuing geography-related careers.
14	18. Very easy to gain jobs for physics – covers many science field; today's society = science high status. 19. No. More likely to follow my history and language interests.
15	18. Many jobs available in engineering and mechanical work.

	19. Not sure.
16	(No response)
17	19. Engineering
18	(No response)
19	18. Good and impressive looking.
20	18. Physics teacher. 19. No. Because I don't like physics.
21	18. I don't know. 19. No. I'm not sure.
22	18. Just for interest – low preference in engineering as a career. 19. No. First preference is medicine – physics not a pre-requisite.
23	18. There is a large degree of jobs available to a physics competent student. 19. Yes.
24	18. Pre-requisite for many degrees and jobs. 19. Yes. Many applications and reasonably easy to understand.
25	18. Physics leads to a number of diverse jobs. 19. Yes. I enjoy physics.
26	18. Useful for logical thinking. Very widely used. 19. Yes. If I suppose everything in the world is related to physics.
27	18. Engineering 19. No
28	18. So many types and aspects of physics in engineering. I think there are many jobs out there. 19. No. I think I want to be a teacher so I'll teach maths.
29	(No response)
30	18. – Good for job availability - Could get better jobs 19. I'm not sure – but physics is good for options
31	18. Always a job in physics if you wanted one. 19. No. Physics will help me but I don't necessarily need to choose a career in physics.
32	18. Engineer 19. Yes.
33	19. Yes.
34	18. – Necessary for engineering. - Gives ability to go on in higher degrees and greater job availability.

	19. No. I like science but I have a crave for looking after people re nursing. However, physics helps understand motion in daily life – I won't lose it.
35	18. Engineer 19. Yes.
36	18. Not sure. Engineering. 19. No.
37	18. Can't see many prospects except engineering. 19. Yes.
38	18. Engineering – defence force 19. Yes. Sciences
39	18. Chemistry/Engineering 19. Yes.
40	18. An interior designer. 19. Yes.
41	18. Lots of engineering jobs available for people specialising in physics. 19. No.
42	19. Yes.
43	(No response)
44	18. Petroleum engineer 19. Yes.
45	18. It's a great subject to have done and I like it. 19. Yes. Because of well-paid jobs.
46	(No response)
47	18. Architecture, engineering (mining, civil) 19. Yes.
48	18. Electricity company; car-making company; factory 19. Yes.
49	18. Leads to many university courses in science with a lot of job prospects. 19. Yes. Assumed knowledge in university course.
50	18. Job availability is not a problem, but they are not the kind of jobs that I wish to pursue. Scientists in general have insufficient and a lesser job status than is deserved and I am not sure the typical jobs are suited to me. 19. No. I am unsure as to what I wish to do for a career, but I think

	that physics will not be my primary career (although maybe an aspect?). The careers are little limited and there appears to be a glass-ceiling effect.
51	18. Availability – not widespread around the place, probably not many companies; mainly research. 19. No. Not of a huge interest to me.
52	18. Excellent: wide range of choices as a result of physics. 19. Yes. Wide range of career options.
53	18. Physics is used widely in society; it is also related to our modern daily life. 19. Yes. It is because I am interested.
54	18. Physics is a prerequisite for many engineering university courses. There are many engineering jobs awaiting. 19. Yes. I like it.
55	19. Yes.
56	18. There is a shortage of physics teachers. However, there is not a great need of physics availabilities in other areas.
57	(No response)
58	18. I want to do physics course; I will be able to travel and work in a well-paid job. 19. Yes. I have a passion for science.
59	18. Mechatronics engineering 19. Yes. Because it is part of the career I will pursue.
60	19. Yes. To have a better understanding of the universe.
61	18. Good 19. Yes. Everything relates to physics.
62	18. Physics leads to medicine and engineering. 19. Yes. It is my interest and working hard to make this happen which is engineering.
63	18. Mechanical engineer. 19. Yes. Because it matcher with the course I like.
64	19. Yes.
65	19. Yes. I want to become an electrician which is related to physics.
66	19. Yes.
67	19. Yes. I would like to study physics.
68	18. There is availability of job. 19. No. I want to do medicine.
69	19. Yes.
70	19. Yes. Maybe- because it's cool! – It 's the fundamental of everything.

71	19. Yes.
72	18. Wants to become a physics teacher. 19. Yes. Because there are many fields in physics where you can apply for job.
73	19. No.
74	19. Yes.
75	19. Yes. I believe that almost everything is physics.
76	19. Yes. Money.
77	18. Engineering, Professor, Military (weapons research) 19. Yes.
78	(No response)
79	19. Yes. Because I liked physics ever since I joined secondary school.
80	18. There are jobs available; however, they require large academic achievements in physics and maths. 19. No. I do not feel as if I will ever get the marks required for such a job.
81	(No response)
82	(No response)
83	(No response)
84	18. Very good. There are many pathways from Health to Science. 19. Yes. It's interesting and the world's development is based on physics.
85	19. Yes. I want to be a dentist.
86	18. Engineer; Physics teacher. 19. Yes.
87	18. It is a pathway into engineering. In pure physics; little job availability. 19. Yes.
88	18. It's important with lots of engineering, constructing careers. 19. Yes. It depends; might do if I do something in aviation course.
89	18. Engineering; Aviation 19. Maybe. If I don't get into the course I want then I'll pursue a career related to physics.
90	18. Engineering; Aviation 19. Maybe. If I don't get into medicine or dentistry, I'll consider a career that is physics related.
91	18. Important to achieve a very successful and high-paid occupation such as engineering and aviation. 19. Yes. Because it is required and good basic knowledge to have also.

92	18. Depends if you go on to further study in a similar field – in which case it can be very useful. 19. Yes. Possibly, not really sure yet.
93	18. Lots of jobs in engineering. 19. Yes. Because I enjoy it and there are jobs.
94	18. I want to be a physiotherapist, so I want an understanding of physics concepts. 19. Yes. I am interested in human body movement and human anatomy.
95	18. Aerospace engineering. 19. Yes. I don't like chemistry and physics is fun.
96	(No response)
97	18. Engineering 19. No.
98	18. Physics is a vital part of many of the good and interesting jobs these days. 19. Yes. Because I want to be a speech pathologist.
99	18. You can get jobs in engineering. 19. Not sure yet.
100	18. Highly looked upon for jobs; get higher paid jobs. 19. Yes. Because it is interesting.
101	18. Medicine; Engineering 19. Yes. Medicine.
102	18. Physics is very important in some of the higher paying jobs. 19. Yes. Because it pays well.
103	18. I think physics is necessary for any career involving science being the most basic science. 19. I don't know what I want to do.
104	18. Ability to get into technically advanced jobs and highly paid. 19. Yes. I feel I am confident and enjoy physics.
105	18. Yes. Like engineering, construction and architecture. 19. Yes.
106	18. There is a great amount of jobs that require physics including engineering, surveying, electricians, drafts people. Usually the more interesting and thought provoking jobs. 19. Yes. I love finding out how things work, designing new things and understanding out world.
107	18. Engineer; architecture; doctor; physiotherapy

	19. Yes. I want to get into medicine, health sciences, to be a doctor.
108	18. N/A 19. Don't know.
109	18. Physics leads to engineering. Engineering = Job opps for women = money $ 19. No. I am interested in medicine.
110	18. Useful; extremely important. 19. I really have no idea.
111	18. Leads into engineering. Engineering is in high demand i.e. a lot of job availabilities. 19. I'm interested in maybe pursuing a career in engineering.
112	(No response)
113	18. N/A 19. Yes. I want to be a vet.
114	18. Can do engineering. 19. No. More interested in health sciences.
115	18. N/A 19. No.
116	18. N/A 19. No. Not interested.
117	18. Engineering; Architect 19. Not sure what I want yet.
118	18. Engineering, architecture, chemical engineering, etc. Jobs readily available. 19. Yes. I am interested in landscaping and architecture or medicine.
119	18. Crime scene investigator; Engineer + more… 19. No. Because I don't want to.
120	18. There is a wide range of jobs for physics-related jobs. 19. Yes. Medicine.
121	18. Leads to good jobs. 19. Don't know.
122	18. Physiotherapy. 19. Maybe. Interested in health sciences more than physics.
123	18. Very good jobs when you have done physics. 19. No. I am not very good at it.

124	19. No.
125	19. Yes. I like it.
126	19. No. I am not good at physics.
127	18. Job availability – not sure of those specifically in physics but those in related fields such as engineering, etc., quite a good job status. 19. Yes. It is an area that interests me.
128	18. Highly paid; Variety of areas available. 19. No. I am more interested in other areas.
129	19. No. May possibly pursue a career with some aspects of physics but I enjoy other areas more.
130	18. Job availability increase; higher demand for engineers and the like. People involved in physics well respected because of high level of education. 19. Yes. Interested in engineering.
131	18. I didn't do physics for a job. I am doing it because I am interested in it and enjoy it. 19. No. I am already interested in another area of work.
132	19. Possibly.
133	18. Many jobs at the cutting edge would require knowledge of physics. If I want to do something new and interesting, physics is a good start. 19. Yes.
134	18. High status – Physiotherapy; Medicine; Engineering 19. Yes. I want to be a physiotherapist.
135	18. Helps for getting into higher end math/science subjects. 19. Yes. I enjoy it.
136	19. Yes. Interesting – enjoyable
137	18. Good high-paying jobs. 19. No. Not that interested.
138	19. Yes. Because it is interesting.
139	19. Yes. I enjoy it.
140	18. High status. Gives good opportunities. 19. Not sure what I want to do yet.
141	18. Physics can be fun, e.g. skydiving and car crash investigations, like the guy from "Numbers". Well-paying jobs with high social status. 19. Keeping my options open.
142	18. Not many jobs with physics.

	19. Yes. Engineering, because my parents want me to.
143	18. Well-paid; In short-supply in most industries (environmental engineering, etc.) 19. Yes. Because it is needed for environmental engineering.
144	18. Pilot; Engineering 19. Yes. Wanted to be a pilot.
145	18. Teaching; Engineering; Pilot 19. No. Because it is too hard.
146	18. Good job prospects; Physics = engineering which is a high job status in society. 19. Yes.
147	18. Engineer; Physiotherapist – High status. 19. Yes.
148	18. Engineer; Physiotherapist 19. Yes.
149	19. Yes.
150	18. Get a job in engineering. 19. No. I am more a chemistry, biology person.
151	18. Leads to engineering. 19. Yes. Physics is one of my favourite subjects.
152	18. Engineering. 19. Yes. Physiotherapy. I enjoy it as a career.
153	18. It's useful for the job availability and job status in the society. 19. Yes.
154	18. More jobs can be chosen and will help study physics in university. 19. Yes.
155	18. Engineering skills shortage; pretty good status in the society. 19. No. Too hard.
156	18. Engineering = high status 19. Yes. Maybe an engineering course because it sounds interesting.
157	18. Physics is useful in science-related careers, and these opportunities are growing. 19. Yes. I would like to study at Uni in science degrees, etc.
158	18. Physics enables people to choose from a wide range of jobs. 19. Yes.

159	18. Engineering; Teaching; Pilot 19. No. Because I like other things better.
160	18. Conducts research in developing new and improved systems; High-paying and important status; e.g. Medical physicist, forensic investigator. 19. Yes. As I think it is interesting and I am good at it and enjoy it.
161	18. Physics is about life. 19. Yes.
162	18. It is necessary sometimes. 19. Yes.
163	18. I think many available jobs use it, but I have no idea. 19. No. I don't enjoy it enough.
164	18. It leaves options open if I don't want to do something chemistry-related. 19. Maybe, because it's my fall back option.
165	18. Physics = a lot of jobs 19. I don't know what I want to be.
166	19. No. I am not interested in any job that have physics involved. Just get high marks.
167	18. That you can get into maths-type subjects like engineering as well as physics subjects. There are lots of job opportunities. 19. I don't know.
168	19. Yes.
169	19. No. I enjoy other subjects better, so I will probably do something with them.
170	19. No.
171	18. Good. 19. Yes. Because it is easy and interesting.
172	18. There are a lot of jobs available in Physics. 19. Yes. I am not sure why.
173	18. There are plenty of jobs available in this society and if we have a look, the whole world is about Physics. 19. Yes. Because I want to do IT engineering so I need Physics.
174	18. There are a number of job opportunities using Physics. 19. Yes. Physics is needed in Medicine, and I am interested in pursuing a career with this.
175	18. For engineering. 19. Yes. Because of monetary purposes.

176	18. I'm interested in Physics in general; whether I incorporate it into job aspects I am uncertain of. 19. Maybe. I am not certain of the current time whether I will make a career choice out of my interest in Physics.
177	18. Many high rate jobs. 19. No. I won't pursue a job that I am confused with.
178	18. I think the demand for jobs that have something to do with Physics is high. 19. Yes. Engineering has Physics qualities involved in it.
179	18. Lots of jobs with high income and respect from the community. 19. Yes. Because there are a lot of opportunities.
180	(No response)
181	18. A lot of job availability, but may branch into engineering and the like. Jobs at research have fairly high job status with better than average income but not as much as say, a doctor. 19. Yes. I wish to do Medicine or a similar thing.
182	19. Yes. I like Physics.
183	18. I perceive Physics as a good standard for jobs that require some degree of science and mathematical education. Job availability is still at a good level for Physics students as I plan on going into a computer systems course which requires Physics. 19. Yes. Because it is required for the university course I wish to take, computer systems engineering.
184	18. I Physics and understand Physics. Maybe I might do an engineering course. 19. No. My first preference for uni is Pharmacy.
185	18. There are quite a number of jobs available around to get into if you have a Physics background. 19. Yes. I am an athlete and am really interested in Biomechanics which furthermore involves Physics.
186	18. Most high status or highly paid jobs require some Physics knowledge. Employers would perceive Physics as a hard subject and may give people with that knowledge useful to consider. 19. No. I am better at subjects such as English and History and also find them more enjoyable.
187	18. I believe that physics will help assist you in any aspect in the society that also has anything to do with maths. 19. Yes. I want to be a pilot and/or engineer. Both careers involve Physics.
188	18. Physics jobs are hard to find, usually at universities and they are not highly paid.

	19. Yes. Physics is great fun and is interesting.
189	18. Not sure. 19. Yes. Because I want to.
190	18. There are numerous jobs in the field. 19. No. It is not a passion, just an interest.
191	18. You need Physics to be able to have a job in Medicine and Engineering. 19. Yes. It relates to the job I would like to do.
192	18. It provides a wide range of careers if someone mastered Physics. 19. Yes. Physics is interesting.
193	18. Not sure. 19. No. I don't know what I want to be yet.
194	18. Not really sure. Engineering? 19. No. I have no idea what I want to do.
195	18. Physics is important to human life and the society. Jobs in terms of Physics are important. 19. Yes. Because I want to do Bachelor of Optometry in university.
196	18. Good job availability. High/middle status in society. 19. Yes. I wish to do engineering at university.
197	18. Physics helps in jobs relating to sciences. 19. Yes. I am interested in the universe.
198	18. I don't really know any readily available Physics jobs. 19. No. There are other areas which interest me more.
199	18. Don't want to pursue a career in Physics. Don't know about the job availability. I respect and I think everyone respects scientists very much. 19. No. No reason, I want to be a doctor. Don't know if it's related to Physics in any way.
200	18. Physics is a valuable subject, as it is a prerequisite for many courses which I am interested in (dentistry, medicine, etc.). 19. Yes. Because I know that Physics is a prerequisite for the courses I am interested in.
201	19. Yes. It's an interesting subject.
202	18. There are a few jobs these days which require you to have taken a Physics course so Physics itself is seen as a less important subject. 19. Yes. I think I will pursue a career in Engineering which in some cases involves large amounts of Physics.

203	18. I think that doing Physics will make it easier for me to get into the mechanical job that I want. 19. Yes. Because I enjoy mechanics.
204	18. I don't really know. 19. No. I don't really see myself going down that path.
205	18. Many engineering courses at uni require Physics as a prerequisite. 19. No. More interested in pursuing a career related to Chemistry.
206	18. Engineering 19. Yes.
207	18. Engineering. 19. No. I want to do Medicine.
208	18. Better career options. Better employment options and so better wage and position in the society. 19. Yes. I am interested in Engineering.
209	18. It is necessary for careers like engineering or science. 19. Yes. A lot of jobs require a basic knowledge of Physics.
210	18. Limited. 19. No. It's not what I want to pursue.
211	18. Physician; Engineering
212	18. There are lots of jobs that contain/use Physics like engineering. Its job status is pretty high and it has good money. 19. Yes. I am most likely going to study architecture. I did Physics because I was interested in it and I thought it was used in architecture.
213	19. Yes.
214	18. You need Physics to study aero-engineering. 19. No. I'm not interested in careers in Physics.
215	18. Some sort of engineering or medical radiation. Lots of jobs. Good status. 19. Yes. Because I enjoy Physics.
216	19. Yes. Because I aim to become an engineer.
217	18. Used in engineering; used to design safety equipment 19. Yes. I like engineering which requires Physics.
218	18. Very important. 19. No. I don't want to.
219	18. Very important. 19. No. Not what I want to do when I get older.

220	18. Opens you up to better employment (more sophisticated) 19. Yes. I want to do a form of engineering.
221	18. I believe that you need Physics for many jobs, i.e. engineering and anything construction-wise. 19. Yes. I want to be an engineer.
222	19. Yes.
223	18. I think Physics is the best starting point for a career. 19. Yes.
224	18. Fairly wide range of jobs requires Physics. Status is fairly high. 19. Yes. Physiotherapy requires Physics knowledge to throughout the university course.
225	18. Engineering. 19. Yes. Engineering.
226	18. Good for engineering and there's a lot of jobs in that profession. 19. Yes.
227	18. People think smart people are choosing Physics for their subjects. So people prefer students who did Physics. 19. Yes. Not many students do Physics and it is the core of science. There are many job opportunities.
228	18. Engineering. 19. No. Not interested.
229	18. Useful in some fields but not in many. 19. Yes. I am good at maths and ok at Physics. Engineering.
230	18. Low job availability but useful as part of other jobs, i.e. Medicine, Engineering. 19. No.
231	18. Job availability: very good; Status: medium to high 19. Yes. I like Physics.
232	18. Scientist; Teacher; Engineering 19. No. Not interested.
233	18. Jobs available; Nerdy scientists frowned upon. 19. No. Not interested. I am only in it for marks.
234	19. No.
235	18. Not really useful other than for engineering and science. 19. No. I have some ideas about my future.
236	19. Yes. Engineering – mechanical.

237	18. Many options/possibilities. 19. No. Not my strongest field.
238	18. Decent pay and they are wanted. 19. No. Maybe because science isn't that great.
239	(No response)
240	18. Physics is predominant in engineering which is in high demand. 19. Yes.
241	18. They are good; high availability. 19. Maybe. I don't know.
242	18. I believe jobs in Physics get you nowhere unless you want to some dodgy researcher and get 40K for the rest of your life. 19. No. No real jobs.
243	19. Yes. Maybe…not sure of what I want to do.
244	19. No. Because I cannot see myself doing Physics after school.
245	18. Not much could be better. 19. No. I love money, and there's no money in Physics.
246	18. Inadequate – leads to nowhere. 19. No. Not interested. No motivation due to lack of future work.
247	18. Engineering 19. Yes. Because I am interested in engineering.
248	18. Mining; engineering 19. No. I'd rather do something sport-related. But I could be where it is a possibility.
249	(No response)
250	18. Physics is almost as important as maths and vital for jobs like engineering, etc. 19. Yes. I'd like to do engineering or civil aviation.
251	18. Very aware of job availability (mining, etc). 19. Yes. Interesting work, travel, good pay.
252	18. Very aware of future work (e.g. mining). 19. Yes. I am interested in the work, pay and travel.
253	18. Engineering. 19. Yes. I like engineering. It's very practical and interesting.
254	18. Engineering 19. Yes. I like engineering.
255	18. Engineering; architecture

	19. Yes.
256	18. Good for specialised jobs and courses which require Physics, for example, Medicine, Physiotherapy and Engineering. 19. Yes. I enjoy Physics and I am interested in it.
257	(No response)
258	18. There are many opportunities for Physicists in our society. 19. Yes. I am very interested in engineering.
259	18. It is very good when trying to get a specialised job. 19. Yes. Because it is a pre-requisite for the pre-veterinary studies.
260	18. Car design; industrial design. 19. Yes.
261	18. Not many jobs purely for Physics, but it is important for many jobs. 19. No. More interested in Chemistry.
262	18. Like anything these are varying paths of varied availability and status. I believe in a pure Physics field it would be difficult to find employment but social-intellectual status would be high. 19. No. Although a pure Science degree and career path appeals to me it is not what I wish to do. I would prefer a job with direct social influence.
263	18. Well respected; discoveries directly related to our existence. 19. Yes.
264	18. Not sure – haven't done any research though. 19. No. Not sure it it'll lead anywhere. Better at maths.
265	19. Yes. Interest in exploring the world.
266	18. Not many jobs; well respected by public. 19. Yes. Highly interesting.
267	18. Lots of opportunity. Always new things to understand in Physics 19. Yes. Enjoy Physics.
268	18. Physics jobs are more elite jobs and will most likely require me to move around. 19. Yes. Physics has always interested me.
269	18. If you work hard enough you can land a job that you enjoy. 19. Yes. It is an area I am interested in.
270	18. Physics grants status and is essential in gaining a job in engineering. 19. Yes. I want to be an engineer.

271	18. Unsure – reasonable job availability? 19. Yes. Want to do engineering – applied science. Interested in applications of Physics and Chemistry in everyday life.
272	19. No. Does not interest me.
273	18. Research; teaching; respected and generally admired positions. 19. Yes.
274	18. Decent availability; good status. 19. Yes.
275	18. Job availability is good in Physics and has high status. 19. Yes. I love Physics.
276	18. Not great. 19. Yes. Because it's fun.
277	18. Not much available in terms of jobs. 19. No. Interested in pursuing other interests.
278	18. Applications of Physics in jobs like engineering are particularly important. However, in straight Physics jobs like research, I do not see high job availability. 19. Yes. I like engineering or perhaps Theoretical Physics research.
279	18. Physics is perceived as being quite hard, and I think that people who do Physics are generally labelled intellectual. 19. Yes. Because I enjoy finding out how everything in our world works, which could be achieved through the study of Physics and the use of Physics later on in my career.
280	18. The theory is interesting, although I haven't been exposed to any jobs that use Physics, being brought up in a country area. 19. Yes. My BSc (nanoscience and materials) was particle relationships at the quantum level and Physics will be essential
281	18. Not sure of the range of jobs available for Physics. I assume many are for research. 19. Yes. Perhaps if I find a job relating both Physics and electricity.
282	18. Defence. 19. Yes.
283	18. Interesting jobs but not a high demand in certain fields. 19. No. Already have an alternative career path.
284	18. As a straight degree I feel it would be limited but when combined with other subjects and degrees it creates a more wide job opportunity. 19. Yes. Encourages me to want to understand what processes are

	going on in everyday life.
285	18. Relatively unknown status in society; hopefully an available job. 19. Yes. Doing Physics and Engineering. Hope to find something involving both.
286	18. There will not be very many jobs out there fore pure Physicists and no class in society. 19. Yes. That's what I am interested in.
287	18. Job availability is OK. Not a huge deficiency of jobs. The status is of highly educated; so very smart. 19. Yes. It is quite interesting and it would be something I'd enjoy. However, I see the application of the course in society is minimal.
288	18. Unsure. Seems not many jobs available in Physics. 19. Yes. Because I appreciate Physics.
289	18. Physics is fairly intense, such that if you are able to finish or complete Physics with a reasonable grade, there are great job prospects. 19. Yes.
290	18. Lower job availability but a job status. 19. Yes. My goal is to become an astrophysicist.
291	18. Physics leaves me with options to enter many fields, and enhances my understanding of the physical world. 19. Yes.
292	18. None. 19. No.
293	18. Fairly good job availability around the world; not so much in Adelaide. 19. No. Will most likely so into another degree.
294	18. Moderate level of job opportunities. Moderate to high level of status. Underpaid; difficult to find high paying job. 19. Yes.
295	19. Yes. Because I enjoy it.
296	18. Good, but only for high level Physics. 19. Yes. I enjoy Physics.
297	18. For Physics – just Physics, not sure of high job availability. 19. Yes. My favourite subjects – Physics/Maths
298	18. Limited but good status. 19. Yes. It interests me.
299	18. I think there may not be many jobs.

	19. Yes. I study Physics.
300	18. Physics in mechanical engineering; Statics – pertinent to Civil/Mining engineering. 19. No. My interest lies in mining so as far as it applies, I will be using.
301	18. Vital in all, science-based degrees such as engineering. People are more sought-after with Physics knowledge. 19. Yes. Engineering, fundamental to the working of life.
302	18. High level at application to all disciplines of engineering. 19. Yes. Engineering is awesome.
303	18. Broad field; many opportunities. 19. No.
304	18. I know there are jobs out there but don't have a lot of information on what job prospects there are. 19. Yes.
305	18. In pure Physics I feel the job prospects are narrow but Physics is useful as part of another degree. 19. Yes. I need it for engineering.
306	18. Physics by itself is not a viable job due to availability; but jobs that integrate Physics such as engineering are high. 19. Yes.

Answers to Item #18 and #19: **(Filipino Sample)**

Respondent No.	Answers
1	18. Contrary to the popular belief, various job opportunities are available for a physics graduate. Applications of physics encompass the social sciences (e.g. modelling of social behaviour patterns), economics (stock market analysis), research and development, industry and the academe.
2	(no answer)
3	18. – Physicists are in demand - Physicists (and scientists in general) are essential figures in the society 19. I think physics will spearhead the next scientific revolution.
4	18. In the Philippines, not much, but in the other countries, I've heard that there is a demand for physicists there.
5	18. If you are a physics major, most likely you'll end up being a teacher. There are few job opportunities. 19. Since I am a physics major, of course I will want to pursue a career related to physics.
6	18. Physicists are in need around the country and in the whole world; job availability is high. 19. Physics interests me and inspires me to do more things; it is logical for me to pursue a career in such field.
7	(no answer)
8	18. In terms of job availability, physics has a good number of jobs to choose from. It can be in the academe, industry and research fields. 19. Having a good background in this field with extensive training from the best physics faculty, I think it is likely for me to pursue a career in this field.
9	18. Hard to find job. Physicists usually go to academe. 19. I'm taking Physics course now so I think I'll just continue this.
10	18. In our country, for me, minimal demand. 19. I feel I want to do Medicine.
11	18. It has a wide area of coverage giving dynamism to the student/applicant which gives high job availability and status. 19. I am very much interested tinkering/innovating things.
12	18. When one says physics graduate, one can think highly about the person. I'm no different, I know it's a course with a lot to offer but honestly, I don't know all of them. 19. Physics isn't actually my calling. I'd prefer communication courses than physics.
13	18. I took physics as a pre-med course

14	(no answer)
15	18. Gives a lot of opportunities
16	18. I can help make machines. 19. I like biology more
17	18. Since it's a science subject it's one of the in-demand jobs. 19. I'm not that good in physics and I'm not really interested in it.
18	18. I think it's a job with high demand because only few take it, and it's a high-paying job since there are a few graduates.
19	18. It depends how far or broad your capabilities are. But most physicists should do well. 19. It sounds interesting and promising.
20	18. It's a very highly-qualified job. I believe that only a select people can really handle physics. There is a lot of career opportunities, but only a few who can actually understand physics. 19. Because the pay is high.
21	18. I'm not sure if there are a lot of jobs concerning physics here in the Philippines. If I study physics I would most likely leave the country to find a job. 19. I'm not really that good in physics and there are certain lectures that I'm not into and are very confusing for me.
22	(no answer)
23	18. There are not many openings for physics majors in the Philippines. 19. I am not very interested in physics.
24	18. There are many physics-related jobs. 19. I like chemistry better and computers.
25	18. Moderate job availability 19. I prefer the biology field.
26	18. Most of the physics graduates end up teaching or they pursue a job that is very different from what they visualize.
27	18. Few job opportunities in physics. 19. One of my courses of choice is civil engineering. I think you need physics in this course.
28	18. Moderate job availability with high salary. 19. I am more into computer programming. Besides, I hate physics.
29	18. I find it hard to think about practical usage of physics in business. Jobs may be of personal or low-earning nature. 19. Physics interests me.
30	18. It's not something I'd be doing in my job.

	19. I'm not interested in physics.
31	18. It is essential if you wish to pursue careers in computer science/engineering.
32	18. Boring. 19. Probably because it's required in game development. But no, not the hardcore physics.
33	18. You're gonna go through a lot mathematical and scientific pain but you're not gonna land on a high-paying job in the future…so the only reason why anyone would ever take physics is that he's a geek, a nerd, probably a loser. 19. Besides the fact that it wouldn't pay well in the future, I don't see its significance in everyday life. I don't see how it's gonna help in making the most of my life.
34	18. I think Physics graduates are in high demand because there are only a few graduates nationwide.
35	(no answer)
36	18. It is easier to get a job because only few have the inclination in physics. 19. I won't pursue a career in physics because I am not that inclined with it.
37	18. It's hard to get a job, but if you do find a job the salary I think will be large. 19. My heart is not into it.
38	18. Physics can't help me find jobs. 19. Because I am poor in physics.
39	19. I want something else.
40	18. For me (physics) is not that applicable in the course I want to do. 19. I hate it!
41	18. It's not important. 19. It's boring.
42	19. Because I am not good in computations.
43	18. If you know more about physics, you would have a greater chance to get employed in a physics-related job. 19. It isn't in my heart.
44	18. Teacher. 19. It's not my interest.
45	18. It's either one will be a teacher or work on projects and it's not a job that attracts many people because it's hard to earn money. 19. Physics itself is okay, I just don't like the math part and I think I

	won't be successful if I will pursue a career related to physics.
46	18. I think physics related jobs are few. 19. I am not really inclined to physics.
47	(no answer)
48	(no answer)
49	18. Job availability for me is hard, if my course will be physics. I find physics hard. 19. I find this subject hard. I am not good in math.
50	18. If you study physics, you can be a teacher and a scientist. 19. Because I want to pursue a career in Asian studies.
51	18. For me, physics-related courses are not that popular. However, those who graduate with these courses can have jobs in upper-scale companies. There is only limited job availability but they are high level jobs. 19. Because it is one of my interests and only few tries for it.
52	(no answer)
53	18. Teacher… 19. Because I am more interested in other fields like integrated technology.
54	18. I think you'll have an edge if you excel in physics in terms of applying in jobs which are related to physics. 19. I am not that interested with physics.
55	18. I think you will have more opportunities in finding a good job if you have something or even excel in physics. 19. Because physics is not the subject I excel with. I am really not good in physics.
56	19. I don't think so.
57	18. If you excel in physics you can have a successful career in any branch of science. You can also be a teacher and physicist. 19. I think so because I want to be a teacher.
58	18. There's only a few opportunities in physics-related jobs here in our country. 19. Because it is not my interest.
59	18. None 19. I don't have any interest in studying physics.
60	18. Well, it can be an opportunity to get good jobs because the competitions of physicists are not as great as nurses. 19. It's not my forte. I don't want to pursue something that I am not excelling.
61	18. Not that important.

	19. I am not that good in physics.
62	18. Not much really. I've heard of just few things about physics-related jobs and I don't know much about it. 19. I'm not that good with physics and I don't really enjoy it as much as I enjoy calculus and computer science.
63	18. Not that high. 19. I'm not that totally interested.
64	18. I think there isn't much job opportunities if I do physics. I guess there'll be less salary. 19. I personally don't like physics. Besides there's less financial opportunities.
65	18. For me, as I see it now, there's no high terms of job availability or status in society.
66	18. It is somehow difficult to pursue because aside from it is complicated, few jobs are available related to physics course. 19. I am not good in science and it's not my field anyway.
67	18. Not really needed. 19. I'm not very interested in physics. It's not my forte.
68	18. Highly needed. 19. Because I want to go to NASA and work there.
69	18. Physicists are stuck behind scientific gadgets to observe daily condition of the weather and other stuff. 19. I think I am better with language-related courses.
70	18. In our country, job availability in terms of physics perceptions is not that big impact and demand to the society. 19. Because I want to pursue a career related to business management.
71	18. If your expertise is physics there are lots of job opportunities waiting for you. 19. I'm not that good in physics.
72	18. For me, job availability in terms of physics is not that good but it is in the person how he handles his job and how he can make a difference. 19. Because I want to pursue a career related to music, it is also affected by physics but only a little.
73	18. I think physics has no or limited use in terms of job availability and job status in the society. 19. I am not fond of physics.
74	18. I think about physics in terms of finding a job will be hard because there's not much available jobs for physics majors here in

	the Philippines. 19. I am not that fond of physics.
75	18. (no answer) 19. Because I am not really that good in physics. Besides, If ever I choose a physics-related course, I want to work for NASA which is quite impossible.
76	18. I have no idea. 19. I just don't like the computation part of the subject…and I am not interested.
77	18. Physics may also be of great help to find explanation for phenomena. 19. No, because I am not that good in physics and it is not my field.
78	18. I think people value the person more because they excel more in physics. Maybe the salary is much higher from others. 19. If I pursue a career in physics, I will just make myself terrible and more effort-making person.
79	18. I think physics-related jobs are usually in demand in technologically advanced nations, where there are space-exploration institutions, etc. 19. I prefer business-related courses.
80	18. People study physics have a high possibility to have jobs. They know why some things behave like that and it's a norm for them. 19. Maybe, because my parents want me to be an engineer and it needs physics concepts.
81	18. Physics can be really helpful in terms of job status since most of the phenomena or everything under the sun can be explained by physics. 19. Since most of successful businesses are usually related with physics, and I prefer those that will make me successful.
82	18. I don't think I will not be successful if I will take up physics. 19. I am not interested in physics and I don't want to teach the subject.
83	18. High salary due to lack of employees…and physicists or students who have courses related to physics were hired at NASA or other big companies. 19. I don't actually like physics.
84	18. There are lesser opportunities for job/employment but I still admire and look high at those people who have finished physics courses. 19. I'm not really that good in physics and my interest is actually

	not in it.
85	18. Physics can help to get jobs, because physics can be applied in some jobs.
86	18. There are less job opportunities if you'll get physics course. It is because it's not everyday you build a house nor build some bridges. 19. This course is not in demand. And, I am not really into pursuing a physics course. I prefer diplomatic courses.
87	18. Job availability and job status of physics-related jobs are in question. 19. Because the jobs related to physics are not in demand.
88	18. Hard to get a job. 19. Because physics is hard.
89	(no answer)
90	18. It is good because only a few do this course. 19. It is not my interest.
91	18. Physics is fun but I am not that interested. 19. I'm not interested.
92	18. It's good. 19. We all know that physics oriented subjects/jobs are really hard so I don't want to pursue this kind of career.
93	18. Knowledge in physics is great help in having a good job.
94	18. I think there are limited; I mean few jobs available for physics graduates. 19. It's not my interest.
95	(no answer)
96	18. Physics can be used in everyday applications. 19. Because I think I can use physics in my career.
97	18. A hard subject, but can be used in our daily lives. It also depends on which company you'd like to be hired into. 19. Because I know I don't have enough knowledge to pursue a career related to science.
98	18. It can help us because in our day to day living physics is always involved. 19. Because I am not good in physics but I always try to learn it.
99	18. I think physics has a great importance in terms of job availability. It also helps us become aware of the different phenomena around us and how they came about. 19. Because I want to become a successful nurse someday and I think physics plays a significant role in that field.
100	18. When you are skilled in physics you will not be discriminated.

	You will be looked upon and considered important in the society. 19. Because you can learn so many things in physics.
101	18. In investigations, daily time management, electricity, etc., we can use physics in these fields. 19. I think I like it.
102	18. Studying physics is challenging and an adventure. But sometimes it is hard to understand. Regarding jobs, if you get physics degree, chances are you will go far. 19. Because I want to pursue a career related to accounting or economics.
103	18. For me, physics is important to our society. It can help us to understand phenomena around us; from moving vehicles to electricity, to waves and light. Physics is all around us. 19. I want to know more about our natural world. This is the beauty of physics because it covers everything.
104	18. Physics is important in everyday living. 19. Too difficult for me to understand physics concepts.
105	18. Physics is very important in almost any course. In nursing, for example, if you have a sound background in physics, it would be easy for you to learn how to use the different equipment used in the hospital. 19. Actually, I hate physics. I really hate it.
106	18. I think physics is really important. Even though I don't prefer physics, I think it is really needed. 19. Because I am not interested in this subject…I think it's really hard.
107	18. For me physics is very valuable. Physics can be applied to many things. Airplanes are a result of knowledge in physics. 19. Because my dream is to become a pilot, and we need a lot of physics knowledge in navigating, flying, etc.
108	18. Physics is present everywhere in our daily lives. It is also the basis of technology. Physics is really important. 19. It seems that physics is an elusive subject for me. As a result, I tend to hate it.
109	18. Physics is the main root of science. 19. I can apply things that will learn in physics in my day to day life.
110	18. Everything around is involves a lot of physics. 19. Because my course choice is related to physics.
111	18. I don't have an idea about physics in terms of job availability and job status in the society.

	19. At first, I didn't like physics. But I've grown to like it because you get to understand so many things happening around you. It just takes a lot of patience to learn physics, especially its math component.
112	18. For me physics is very important in our daily lives in these modern times because most equipment is based on principles of physics. 19. Because I have the self-confidence and patience.
113	18. I think physics is very important to our society because it has many applications in different courses like engineering, nursing, etc. 19. Because I know I am not good on it ever since.
114	18. It will help because physics is related to everything that surrounds us. 19. Because I think the course that I am going to choose is not related to physics.
115	18. For me it is very important because we are applying to our everyday activities. 19. Because it is one of the subjects which I am good at.
116	18. It helps us in our daily living in the society. Physics is helpful for the development of things. 19. I don't like the subject physics. For me, it's difficult unlike other subjects, and I am not fond of computations.
117	19. Because I can use it in developing my future career.
118	18. Physics is important because it can help in our daily living. 19. It is related to the course I intend to do.
119	18. With your knowledge of physics it would be easier for you to understand how machines work. 19. Physics will be useful for me doing an engineering course.
120	18. Because of physics we are now enjoying a lot of conveniences in our everyday life, such as televisions, microwave cooking, etc.
121	19. Because not all is related to physics.
122	18. Physics knowledge can be used to operate machines/high-tech equipment easily. This makes physics important in the society. 19. I could use physics knowledge even if I do nursing.
123	18. Physics is important because it can be applied to almost anything.
124	(no answer)
125	18. If you know physics, you will be able to know how to use and easily learn to manipulate machines/technology innovations around you. I believe you can also find a job easily. 19. It's not my heart's desire.

126	19. Because almost all of the degree courses have a subject related to physics even though sometimes we don't like it.
127	18. We apply principles of physics in almost everything around us. 19. The course I want to do is not related to physics.
128	18. Physics helps in finding a good job. 19. My course preference is related to physics.
129	18. Well, I think physics can be applied in any job. There are times when individuals are not aware of it but the principles of physics are being applied in everyday living. 19. I prefer mathematics than science. It's easier for me.
130	18. Physics can be applied to almost anything. 19. Physics is difficult.
131	18. Few jobs. 19. Law of physics should be implemented in some softwares.
132	18. Too eccentric for me.
133	18. Too foreign for me. 19. I don't like it.
134	18. I think that there are a lot of jobs, though none of them really appeal to me (except for game development). 19. I want to make games.
135	18. I think physics is important…especially to civil engineer. 19. I already chose computer science over physics but if I'm given the chance to merge the two, I will.
136	18. I think that they have important jobs. 19. While I think it could be really interesting, I don't think I am good at it.
137	18. Average to high paying but low availability. 19. Because it could be interesting.
138	18. Physics would not be in demand as much as other courses. 19. Physics will not make me get a job quickly.
139	18. Those who graduate with a physics degree do not have much job opportunities in the country. 19. I am a computer science student and some physics concepts are not so much relevant to my course.
140	18. Plenty of opportunities, especially if coming from a prestigious school. Wide variety of possible career paths to take. 19. It's not interesting for me.
141	18. A rare, respectable breed.

	19. It goes hand in hand with game programming.
142	18. There isn't really a lot of well-known jobs related to physics here…(or so I know). 19. There is physics in games.
143	18. Having lived in Geneva, I knew some adults who worked in CERN. 19. I want to explore field of architecture/engineering.
144	18. Very technical and a lot of research work. 19. Computer science is somewhat related to physics. But I think it would only be concerning general things.
145	18. In the Philippines, science graduates are very few and there is not much encouragement (or incentives) to engage in scientific investigation. I think that although there are jobs available, it does not really encourage deeper investigation.
146	18. Average-paying, decent demand. 19. Not interested.
147	18. None 19. Being a computer science major, certain physics concepts will be irrelevant.
148	18. I think there are a lot of jobs available; it also has a quite high status. 19. It has too much maths.
149	18. There are not that many jobs for physics graduates. A lot of physics graduates end up being teachers. 19. Computer science needs physics especially in making images.
150	18. Physics-related careers are not so much dominant here in the Philippines but I think we need more people so that physics will not "die". Job status will fall to engineers, teachers, etc., which is okay. 19. Because I am not so good in physics, and I am currently taking management course.
151	18. No money in being a scientist. 19. Because I am a racer.
152	18. In terms of job availability, there are only a few jobs available. In terms of job status, physics plays one of the most respected parts in our society. 19. There are only a few jobs related to physics.
153	18. Professor, Researcher, Analyst, Engineer. 19. I think only the really talented in physics last in attaining a good

	career in physics.
154	18. Rarely available jobs that have good pay. Many years in the lower rank of the working ladder. 19. I opt to have another career I am passionate about. I am not keen on doing physics as a job.
155	18. The job availability and job status is quite low and poor. 19. Physics is not one of my strongest subjects.
156	18. Less job opportunities than business courses. I think only those who are really gifted can be able to make good profession out of it. 19. My course is far from it because it is a business course although there is always the possibility of it somehow.
157	18. In the Philippines, I hardly even hear things about physicists. I just know that they write physics books. 19. I'm not good in physics. I like chemistry better.
158	18. If I become physics major, I think the jobs I could take are teaching and doing research. 19. I think it's because I understand other subjects better or I can do better in other subjects than I do physics.
159	18. In the Philippines, physics is not supported by the government so job opportunities are low. 19. I have already chosen a course or degree program in my university.
160	18. Physics has low job availability. It's either being a teacher or in a factory/company. 19. I do not think physics as a career will suite me. Physics is complicated. Too many concepts. I already a course in mind that I prefer.
161	18. The Philippines may not have the adequate instruments to make really good physicists. 19. I already have a different career in mind.
162	18. People think highly of those people who are adept in physics concepts but there are not much practical high-paying jobs in this field. 19. I do not know what job to take after taking physics.
163	18. Not too useful in Philippine society (impoverished) in general; may be good abroad, but best when applied in a commercial setting.
164	18. I think physics job availability is moderate. Although the prestige is not much in the society. 19. I like business courses better and I see myself as a businessman in the future.

165	18. There are limited jobs available and that being a physicist or in a job which concerns physics would not profit much (if you stay in the country). 19. My skills are not enough.
166	19. I'm not interested with physics.
167	18. Not a lot of jobs available for physics students in the Philippines, probably because science is not a major national concern. 19. I have plans of taking other courses.
168	18. I believe that physics doesn't have too much job availability and its status in the society is quite low. 19. I believe that I do not have skills in physics, and sometimes I tend to get confused with the material, and thus hinder me from learning/finding a job related to physics.
169	18. It's hard to find a job with a physics degree nowadays. 19. I'm not a physics person.
170	18. I think that there are more job opportunities for people who have background in physics. 19. No, because I am not good in analysing problems that are related to physics.
171	18. Physics explains what is happening around us in our daily lives so I think it would really help me understand better the nature of different jobs. 19. Because other people influence me.
172	18. Physics-related jobs are highly regarded in the society and is quite in-demand. 19. Other people influence me.
173	18. Physics helps when you do engineering.
174	18. Most career/jobs require a degree in physics or, at least knowledge in physics. 19. I am having a hard time understanding physics and I really don't it that much.
175	18. Most career/jobs require an understanding of physics. 19. I have difficulty understanding physics concepts.
176	18. Physics is related to engineering courses. 19. I want to become a nurse.
177	18. Those that are good in physics are intelligent. 19. I want to become an accountant.
178	18. Few job availability but have a high job status in society.

	19. I love problem solving in physics without forgetting the word fun in my vocabularies.
179	18. People give credit to those who are good in physics for their bright ideas and inventions. 19. I'd like to become an accountant.
180	18. I think it is hard being a physicist because not many take notice of them unless they have useful information. 19. I would like to become a pharmacist.
181	18. Government officials seldom give attention to genius physicists, and unless you have an invention, that's the only time you're given big money and credit. 19. I'd like to become a doctor.
182	18. The availability of job for physics graduates is low. 19. It is not related to the course I'll be doing.
183	18. Job availability is low. 19. It is not related to the course I will take.
184	19. Physics is related to nursing, I think.
185	18. I can easily find a job like nursing, med-tech, and especially medicine. 19. I can use it in my future job.
186	18. For me, there are few jobs which are related to physics, and if there are, these jobs are just vocational. 19. I would like to become a surgeon.
187	18. Physics is most applicable when you have appliances at home. Also we can use this in some of our daily activities. Physics helps us to become more accurate when observing scientific things. 19. I'd like to become a physicist.
188	18. Physics is related to everything that we do even those little things we always take for granted. 19. Physics explains the most fundamental facts around us.
189	18. Physics is all about measurements, chemicals, and medicines. 19. Physics can be observed all around us.
190	18. Physics is great!
191	(no comment)
192	18. Usually, physics-related jobs are not that good. 19. I am not that interested to physics or anything about science.
193	18. Physics is related in almost everything that we do. 19. I'm not that good in physics.
194	19. I choose to do it and I know I'll be good at it.

195	19. I am weak in solving different physics problems.
196	18. Physics can be related to many things that we see and experience around us. 19. I am not good in physics.
197	(no comment)
198	18. Status in the society is high due to its difficulty. 19. I don't like physics.
199	19. I don't like solving physics problems.
200	(no comment)
201	18. Physics would be everywhere. I mean, everybody would take this subject before they achieve their success. 19. Because I am not interested in science.
202	18. Physics is useful in almost any career. 19. Because I easily understand physics concepts.
203	18. I think a job that is related to physics is not really in demand today but I think physics will help us to have a better society. 19. I am not really good in physics.
204	18. Physics is very important in terms of getting a job, especially if it is related to science. 19. Because I have some difficulties in studying physics.
205	18. Physics can help us find better jobs. 19. I am not good in physics.
206	18. Physics is important as it helps in getting a job especially if it is related to science. 19. Most of physics-related careers are in demand not just here but also abroad.
207	18. With some knowledge of physics it will be relatively easy to find a good job. 19. I need physics knowledge in nursing courses.
208	18. Physics is not so much in demand, but it can also help in getting a good job. 19. I am not that interested in physics.
209	18. There are only a few job opportunities for physics graduates. 19. I love physics!
210	18. Physics is all about measurement, chemicals and medicine. 19. It is useful to know the principles of physics as you can see and feel physics all around us.
211	18. I think it's helpful. 19. It's hard for me to understand physics concepts.

212	18. Physics is often applied to some of the common jobs nowadays especially jobs which are involved in technologies. 19. I find myself interested in Physics.
213	19. Physics is hard.
214	19. Physics is a hard subject.
215	19. It is hard to study physics.
216	18. Physics is important in nursing/HRM 19. I can study hard.
217	19. I am not interested in physics.
218	19. Physics is a hard subject.
219	19. I'd like to learn more about physics.
220	18. It is important to have at least a basic knowledge of physics because you see physics applications around you every day. 19. I want to know more about physics.
221	18. Physics is important because it is applied to many things in our daily life. 19. I believe anyone can learn physics concepts with focus and dedication.
222	18. Physics is important because we see its applications all around us. 19. I believe physics is an essential part of nursing because nurses have to use hi-tech equipment.
223	18. Physics is important because its applications can be seen all around us. 19. Physics is difficult.
224	19. I am not good in physics.
225	18. In terms of mechanical jobs, it is hard to figure out things without any basic background in physics. 19. I sometimes find physics very difficult.
226	18. Physics is important in jobs related to science and technology. 19. There are many topics in physics that are very hard for me to understand.
227	(no answer)
228	19. I plan to do courses that have nothing to do with physics.
229	18. Physics is very important not only in machines, of course, but also very important because it can be applied everywhere. 19. Since I will take up civil engineering I will have to do some physics courses.
230	19. I want to pursue a career in accounting.
231	18. It is important for everybody to learn at least the basics of physics because physics is all around us.

	19. I'd like to learn more about physics.
232	19. I plan to pursue a degree related to physics.
233	19. I like physics so I plan to finish a degree related to physics.
234	18. Its importance is reflected on the things that we enjoy everyday. If not for physics, we would be living like the crude old days. 19. I am not good in physics. I find it hard.
235	18. There aren't many good job opportunities in the country. 19. The lack of job opportunities discourages me from pursuing a career in physics.
236	18. Physics course graduates aren't really regarded that highly in the job market. They are a dying breed and the course doesn't really help one get a high-paying job. 19. I am currently enrolled in a business course and I plan to enter the entrepreneurial world, not physics. I don't love physics enough to actually want to spend years studying the concepts and what-nots of physics.
237	18. Somewhat limited to the teaching and research profession. 19. It may be too difficult for me.
238	18. Physics is either for research or for a career in education. 19. I don't think that I will get a high-paying job.
239	18. No job availability, but there are some rare opportunities to earn a good living. 19. Not my favourite subject; few job opportunities.
240	18. Other than doing higher studies, those majoring in physics may become physics teachers or work for the Department of Science and Technology. 19. Physics is not my favourite thing in the world. There are other things I'd rather do/be.
241	18. There are no known jobs available to physics graduates. Most physics graduates end up as teachers. 19. I don't think physics can feed me.
242	18. Synonymous with teacher, physicist, professor. Limited job opportunities. 19. I am not interested in physics.
243	18. One thing that stops me from taking physics is the fact that there are limited jobs available after graduation. And sometimes, getting a job as a physics teacher/researcher might be looked down upon by Philippine society. 19. First and foremost, I have no interest in physics or any science. Actually I have a hard time grasping concepts and to be brutally

	honest, I don't see the importance of physics.
244	18. I think job availability in physics is limited especially in the Philippines. We do not have enough jobs open to physics majors. 19. I lack the motivation to pursue a career in it.
245	18. Since we don't have the proper facilities, it would be difficult to pursue a career in physics. I think that the only jobs available would be to become a teacher and scientist. 19. It is not practical to pursue a career in physics because the pay is not that good and we all need money when we are starting out in the real world.
246	18. Physics majors are scientists. There isn't enough job availability for them, only the best/cream of the crop succeeds. They are the ones improving technology. 19. I would like to pursue something else that I look or am good at.
247	18. There are few jobs for physics majors in the society. Most likely, one will become a teacher.
248	18. I think it will be difficult for a physics major to find a job. 19. I have not thought of doing so. I cannot think of many jobs in the Philippines related to physics.
249	18. Very close to nil, and quite low paying. 19. Careers in physics here in the Philippines are low paying.
250	18. There are lots of jobs for physicists, especially construction work, etc. 19. I am not interested in it.
251	18. Difficult find a good job with good salary. 19. Not my type.
252	18. For pure physics, very little beyond teaching. For applied physics, a lot, and all pretty high-paying. 19. Management pays more.
253	18. There are few jobs available for physics majors in our country. 19. I do better in math.
254	18. Wide choice of jobs that are high in demand and offer great pay and the ability to enhance your potentials. 19. It is interesting and offers the chance to enhance my potential.
255	18. Physics courses offer a vast amount of job opportunities. 19. The industry offers many jobs for physics majors.
256	18. I think I'll be able to find a stable job. I'll either become a teacher or a researcher.
257	18. Only a few are well suited for this profession.
258	18. A challenging course/career.

259	(no answer)
260	18. Physics can be used by pre-med students. Students could complete a PhD or become instructor in physics. 19. Physics is one of my passions.
261	18. It has a wide range of job availability especially abroad.
262	18. Offers a wide range of jobs. 19. I'll do physics and continue it on to medicine.
263	19. Because I really think that the country needs more physics graduates.
264	(no answer)
265	(no answer)
266	18. Not enough jobs that would maximize the knowledge of physics graduates. 19. If I don't, I would have wasted 5 years of my life studying stuff that I won't eventually use.
267	18. Vast opportunities for jobs; not greatly appreciated in the society.
268	19. I enjoy physics.
269	18. Not in demand and have rare job opportunity. 19. Physics is my passion.
270	(no answer)
271	18. There are more physics-related jobs abroad than in the Philippines. 19. I am more inclined to do biology or chemistry.
272	19. I want to do mathematics or chemistry courses.
273	18. It is average in terms of job availability. 19. I am more inclined to other sciences.
274	19. I want to do a chemistry-related course and I don't excel much in physics.
275	18. Physicists are not highly regarded in the Philippine society. 19. Physics is not good in the Philippines.
276	18. Not much job opportunities, but very important in the society. 19. I am more inclined to pursuing a career in chemistry.
277	18. Physicist are 'used' to develop/invent more useful things. 19. I am not that good in physics.
278	18. I think physicists could definitely help the society's development in science. 19. I am relatively uninterested in physics compared to other subjects or other fields of science.
279	18. There are only a few jobs available in physics here in the

	Philippines (I think). Usually physics graduates end up as teachers. 19. I would love to but there's not much money in a physics-related job. And, to survive in this country, one has to have a good-paying job.
280	18. If you graduate with a physics degree you will either become a teacher or a researcher. 19. I am not that effective and efficient in physics.
281	18. There are many things where I can apply what I know about physics because physics mostly relates to the "real" world (how things work) so I think it is relatively easy to find a job. 19. I am studying in a science high school and we are trained to understand scientific concepts. I also think physics is, most of the time, fun.
282	(no answer)
283	18. Mostly in the teaching or research fields; there are readily available jobs at a not-too-bad salary. 19. I am more interested in taking up biology/chemistry because I want to become a doctor.
284	18. Physics is complicated with little job but highly paid ones. 19. I find physics hard. I will not be able to enjoy it.
285	(no answer)
286	18. There are few job opportunities in physics. Most if these few jobs involve government institutions with low pay. Physicists have greatly improved the way we live through innovations. 19. It has low pay.
287	18. There's no clear physics-related job which pays high. There are only few jobs in physics. 19. I love math more than physics.
288	18. Physics-related jobs in today's society are abundant. 19. I don't like physics.
289	18. Most physics graduates deviate from the field of physics and those who stay usually teach. 19. Although I like physics, I am not drawn to it as a career choice.
290	18. The job availability for physics is high, I think, and the status is high because there aren't a lot of physicists in the country. 19. I don't really like physics.
291	19. I like physics more than chemistry.
292	18. Many job opportunities abroad (if not here)
293	18. Physics is available almost in every job. 19. I am interested in computer science/engineering.

294	18. There are not many job opportunities in physics.
295	18. Very good….but engineering seems more hands on. 19. I love building things.
296	18. Jobs in physics are good, but many lack interest. 19. I prefer mathematics.
297	18. Plenty of job opportunities abroad (if not here).
298	18. Having a degree in physics is a good thing but you will find it hard to look for a job that's fit for your degree. 19. Mathematics and computers interest me more than physics.
299	18. Physics allows for many fields not limited to research but also even business because of the analytical skills training physics gives. 19. I find it fun and interesting and it does have many job opportunities.
300	18. In the Philippines, a career opportunity in physics is a long shot to take. But if one applies for a job outside the Philippines, one that is related to physics, it is relatively easier. Well, in the Philippines, the academe is where physics graduates end up in. 19. I intend to pursue a career in the medical field.
301	(no answer)
302	18. A physics course does not assure you of a job, although you may get one but it will not be physics-related. 19. I am more interested in biology and the arts.
303	18. Research; Academe; Consultancy 19. Though I feel there is no money in physics, I find the subject interesting enough to think about pursuing a career in it.
304	18. Physics alone has very low job availability here (in the Philippines). The best jobs would come from the academe and consultancy. However, there is a demand for engineers. 19. Math and physics are not my forte or my preference.
305	18. I think there are many physics-related jobs out there and that they usually involve a LOT of computations. I think people who have physics-related jobs are very smart, but there aren't a lot of people who love physics so there aren't a lot of people who have physics-related jobs. 19. I prefer careers that are more hands-on like a career in medicine.
306	19. I will pursue a career in mathematics.
307	18. Minimal professionals in the field of physics; high paying and quite in demand. 19. In contrast to other science subjects, I find physics the most practical and most enjoyable.

308	18. Most of the physics-related jobs are mostly related to research which is kind of boring for me. 19. I don't like research and I would like to pursue a course in mathematics.
309	18. There is a need for physics teachers here in the Philippines. 19. Because almost all courses in college has something related to physics.
310	18. Many available jobs; in demand 19. I want to be an engineer, not a physicist.
311	18. Teachers, mechanical engineers. 19. I am better at computer sciences.
312	18. Since there are few people who are taking physics courses, I think there is a big demand for people who are taking physics courses. 19. It is not what I want, and physics is not my destiny.
313	(no answer)
314	18. I think that there a lot of high income jobs related to physics, and they are still available because not a lot of people are willing to pursue physics careers. 19. It is an interesting subject and there is a need for people skilled in physics.
315	18. Jobs in physics are in demand, and the government rewards people taking physics courses. 19. Not really fond of physics.
316	18. Physics courses can make you become a physics teacher.
317	(no answer)
318	18. Physics is not so in demand. 19. I think I can do better in other fields.
319	18. More physics subjects = more knowledge = more jobs 19. I like math and biology.
320	18. The status is one of intellect, but not power. The jobs are probably in R and D and the industrial sector, and pay is alright. 19. I like Biology.
321	18. I like physics! …And I know that there are great opportunities for physicists.
322	18. It's not something that's popular though I think people with physics-related jobs earn much. 19. I hate physics – physics hates me.
323	18. I believe that those who choose a job related to physics are intelligent people because physics is not very easy. I think there are

	a lot of jobs out there if I become a physicist. 19. I am not interested in Physics as I am interested in English. I like physics but not enough for me to choose a career related to physics.
324	18. Physicist; engineer
325	18. Jobs concerning physics are rare
326	18. Physics jobs are unique and if you like physics, one will enjoy these jobs although I find it hard to look for jobs like these.
327	19. I find physics difficult.
328	(no answer)
329	(no answer)
330	19. Well, it depends on the course I am about to pursue in college, if it is needed then, yes!
331	19. Because for me physics is too hard.
332	18. A physics degree might avail easily someone a job. 19. Physics doesn't suit me.
333	(no answer)
334	19. It will be difficult for me to pursue a career which is related to physics.
335	18. Only few people pursue this field (physics). It is not in demand. 19. Science is not my interest.
336	19. I am interested to take physics/science-related course.
337	18. Physics is not really good in terms of job availability. 19. I would like to do math instead. I am bored with physics.
338	19. Physics can help me attain career success.
339	18. Physics contributes to the improvement of technology. However, because technology is constantly improving, less people with knowledge in physics are needed because computerization. 19. I more interested in chemistry.
340	18. Job availability is low for physics-related jobs. 19. I do not understand physics concepts much.
341	18. Physicists contribute to our society inventions which make our lives easier. 19. I consider physics as part of life.
342	18. There are a lot of jobs related to physics. 19. I will do nursing course, and physics is one of the subjects I will have to do.
343	18. It is important to learn physics. Many courses are related to it.
344	18. Well, for me I think that we should not study physics just because it is required but also because it can help us become "better" people.

	19. I am planning to take up teaching and nursing.
345	19. It is needed in our daily activities.
346	19. I'd like to become a scientist one day.
347	(no answer)
348	18. I think you will get a good job related to physics. There are also many courses that require you to do physics subjects. 19. I can pursue anything related to physics because I can understand those topics in this subject especially if well discussed.
349	(no answer)
350	18. Physics is useful in our daily lives. 19. I need to do physics because I want to take up a pre-medicine course.
351	18. For me, it would be easy to find jobs after graduation when I know much about physics. 19. I don't like physics…I don't understand it much.
352	18. I think it is important because we can apply it in many of our everyday activities. 19. I need physics because I will do a course in Medicine.
353	18. Those that pursue a career in physics can easily get a job. 19. I am not good in physics so I will try other courses.
354	18. Physics is very important because it can help us to improve our life as human beings. 19. Although interesting, it is too hard for me.
355	18. No perceptions about the status of physics in the society. 19. Whatever career I will pursue will have something related to physics.
356	18. Job availability is abundant for anyone who finishes a degree in physics or physics-related courses. 19. To have a good-paying job.
357	18. I don't any perceptions of physics. 19. I believe all courses have something related to physics.
358	19. I think physics is not that too difficult to understand. You must study it well to cope up!
359	18. Physics is a hard one in terms of its job availability. 19. Physics for me is too difficult.
360	18. Physics is applied in almost all of the jobs in the society. 19. I like challenging subjects.
361	19. Physics is hard. Some topics are hard but there are also some that are easy.

362	18. I think physics is quite not needed. 19. I am not into sciences.
363	18. Physics is important. 19. It is not related to the course I want to take up in college.
364	(no answer)
365	18. Physics can help someone who has a degree related to it find a decent job. 19. It is interesting and challenging.
366	18. Physics is a must because it helps us understand things around us. 19. I am not quite good in physics.
367	18. Physics helps to find good jobs. 19. It is interesting and challenging. I like problem solving.
368	19. Because I need to enhance or improve my society status.
369	18. With a degree related to physics, I can find a job easily.
370	18. Physics should be learned because most of the careers we have to choose from have something related to it. 19. I am not good in physics. I prefer English over Physics.
371	18. Physics can help me because it is related to the course that I choose to pursue. 19. I find it interesting.
372	19. I would prefer to do any course except physics.
373	18. Physics can help me find a job easily, especially jobs that are related to it. 19. Physics is interesting.
374	19. I am not good in anything related to physics.
375	(no answer)
376	(no answer)
377	(no answer)
378	18. In terms of job availability, I think there's abundance. In terms of its status in the society, I think it is on a high level.
379	19. I am not good in physics.
380	(no answer)
381	18. If you have a physics or physics-related degree it will help you land on a good-paying job. 19. Physics for me is interesting and challenging.
382	18. I think having a physics or physics-related degree can help me easily get a job.
383	(no answer)
384	19. I am not good in physics.
385	(no answer)

386	18. Very hard to find a job related to physics. 19. I like the challenge physics learning imposes.
387	19. I am not really good in physics.
388	18. Not easy to find jobs. 19. Small job opportunities.
389	(no answer)
390	18. I think it will be easy to find a job if you have a degree that is related to physics. 19. I am thinking of doing a law course.
391	(no answer)
392	(no answer)
393	19. I am not good in physics.
394	19. Physics is very much related to math.
395	18. In demand in terms of job availability. 19. It is also considered as a major subject and it is useful in our daily lives.
396	(no answer)
397	(no answer)
398	18. No comment. 19. I want to do nursing when I go to college and somehow there are a number of subjects in a nursing course related to physics.
399	19. I am not good in physics.
400	19. Because I am not god in physics.
401	18. It is hard to find a job related to physics. 19. I love physics.
402	18. I think having a degree in physics or anything related to it will help you a lot in finding a good-paying job. 19. I am not so good in physics.
403	18. Physics must be learned because we can apply it in our daily activities. 19. I am not really good in physics.

Appendix H

Interview Transcriptions

Interview transcription
Physics Teachers in South Australia

Transcript of the interview with Physics Teacher 1 (PT1)

FB: Good afternoon ____. Thank you very much for giving me this opportunity to do this interview with you today talking about your experiences in physics and your insights about physics education here in South Australia. My first question is what got you to study physics? Who or what influenced you to study physics?

PT1: Well, I think from a very early age I have always been interested in things, I've always watched documentaries. My dad was a real sort of gadget freak who got all those gadgets which sort of got my interest in things. And later on I had a physics teacher who was a sort of a anti-establishment, long hair, involved in the…a partite demonstrations and that…which I sort of had sympathetic feelings towards and said I guess I've gotten to that, and I…I just like knowing how things work.

FB: Thank you very much for that. So I guess your dad had a very big influence on you doing physics.

PT1: Yes, he did.

FB: Now, for you what is the role of physics in our society? Or, how important is physics in our society?

PT1: Well, I…I tell students that when they come to school they look and they never see, and I said that physics is everywhere in the society. All you got to do is look and see…and a little bit of that and you can see it's there. It's probably been helped by the fact that you know they got things like Mythbusters and all that on TV now that they actually see the physics involved but my…my thing is that physics is a melding of ideas and mathematics, and it's one of the few subjects that actually do that. My students complain about it being hard and I sort of tell them that…I use John F. Kennedy saying that…the reason you do physics is not because it's easy but because it is hard. And therefore, you actually appreciate that you can actually understand things and you don't think it's quite hard.

FB: So…then, what got you into teaching physics?

PT1: Ah, well, I like physics. I went to university; I did honours degree in physics. Although my degree was in a physical sciences or physical chemistry, cause I did chemistry and physics and maths and up until I got my degree then I did honours degree and rather than do a PhD, I sort of running out of money and sort of a…I was also…We also started when we actually had to pay for universities and I then I actually got a scholarship through the associated education department so they were actually paying for my tuition fees for a while and paying me money and after doing that you actually had to teach…and that's what got me into teaching physics.

FB: What can you say about the physics education back then and the physics education now in terms of content and ways of teaching it?

PT1: Back then it was lots more rigorous. Lots more content involved and probably less applications back when I did it. The students now, they have distinct lack of mathematical ability, and therefore, if you try to push them too hard, they think that, "ah, this is too hard to do this"…I think this pushes them away because they may like the physics but they look at the algebra involved and solving things and they just can't do the algebra. And you can talk to them about things…might…why it works, but in a bit of paper and you go, "oh my God"…and also it sort of to me, it's sort of around about argument that you take away the mathematical rigour but you put in applications and anyone knows that if you want to fully explain an application you have to actually know about almost a hundred percent. And so that actually shifted from mathematical to maybe conceptual difficulty, and presumes…basically these days they rote learn their applications. It's not like, "here, there's something new, explain that." They can't do that because they don't have the rigorous background in physics.

FB: As a physics teacher what do you tell your students about physics? How do you teach physics in class?

PT1: I guess traditionally, I am like the chalk and talk. I don't use a lot of IT programs. We do use data logging but I first make students like the new ones…Stage 1, they do ticker timers before they actually go and do data logging. So they actually have some physical understanding of the measurement process. We use a lot of demonstrations in class; get out there and take the students out; get them to bounce things; get 'em to do this. Probably, a bit of fun, bit of laughter, bit of joking involved. Also talk a bit about the…a bit of history; a bit of how physics influences people; how some of the great physics minds were not just involved in physics, but they did other things. Try to get students to see that there is physics everywhere that they look, and that they…you can't just say that, well, physics is this subject that we study at school and that it is outside…and, fortunately here we do have some students who work outside, so when they come in…I mean brick layers or push wheelbarrows and we can talk about, well, " when you're pushing wheelbarrow, what did you do?"…and they said, "well, we didn't lift it very high", and, "why did you do that?"…things like that. We try to connect physics with they are doing outside. Okay…and like, when they are riding, well, "who has done that?"…"who has push bike?...how do you turn a corner, how do you this and what happened to the forces on you?" So you try to relate it outside as much as you can. And, uh, they appreciate it more. Again, the problem is in the mathematics, and mainly because we have students here who have very little physics backgrounds…and if they studied physics back in their homeland, most of it was, like, you sit down and do these 50 problems and don't say a word, and they don't actually speak to the teacher. The teacher is God. What the teacher tells you is the word of God and you don't question that at all. So here it's really hard to get students discussing and arguing points of view. A bit of a cultural…because we have a lot of ESL students. But here, I want them to actually argue with me. If I say something, I want them to say…"hang on, I don't know, I don't agree with that"..I'd say, "let's talk about it." But they are resistant in doing that because teachers are supposed to give them stuff to do. And they don't like it when you actually don't give more information…you say, "well, you're going to form this up, you're going to think of it, you are going you push yourself." They want it handed to them. "Tell which problems we are going to do in the book.…No…no, no. Let's…what about those problems, see if you can solve it, and you're going to tell me how"…and…"ooohhh"…and then they tend not to like that.

FB: Do you encourage your students to at least do a course in physics or something related to physics and how do you encourage them?

PT1: What do you mean?...When they leave school?...Uh, in this school no probably not, in other schools yes because in a normal school situation you have students where you actually see that they're good at physics, they enjoy physics so you actually say, well, "what are you going to do?". And most of the students, mostly boys will be engineers. I've got lots of friends who are engineers, and well, I said, well, they are fouled physicists (laughs). And…and so they tend to go that way. Here, not so much because, the students here generally hardly go to universities they kind of…sort of have a very definite idea. And hopefully…well hopefully if you told them they might actually run into finishing a degree in physics. For some, they are quite definite. You know I got a girl who came into physics Year 11 last year, I said, " What do you want to become?", she said she wants to become a nuclear scientist. We feel we had a joke because she's from Iran and…(laughs). You tend not to push too many students here because they tend to have fixed ideas. They only thing you'd be able to do is you might have to actually get some students and have them…well, you're going to do what, because you are going to university?..and they will go "Why?" The adults that we have coming back have very definite ideas. They know exactly what they want to do so we had a student who came back who was doing physics he wants to be a meteorologist, okay, so…and so the adults tend to have…the refugees tend to see university as a way of getting some prestige in the community, getting some money, getting a good job, become sort of a professional person rather than a labouring person which they sometimes see refugees doing here.

FB: Thank you very much.

Transcript of the interview with Physics Teacher 2 (PT2)

FB: Good morning, _____. Thank you very much for giving me this opportunity to interview you today. My first question is what got you to study physics? And who or what influenced you to study physics?

PT2: I think it was the enthusiasm of my high school physics teacher. When I was at school we started off doing general science in Year 8 and then in Year 9 we did physics and chemistry and I think that teacher was the one who enthused me and got me interested.

FB: Thank you very much. Now, for you, what is the role of physics in our society and how important is physics in our society?

PT2: Uh…the role of physics is to explain the universe all around us, and from a basis of that understanding of how the universe ticks…when I say universe I mean everything; not just outside side but also inside. And we do that in clear and logical manner, we can get a better understanding of how to treat this planet.

FB: So what got you into teaching physics?

PT2: I wanted to become a teacher before I wanted to become a physics teacher. When I was about Grade 7, I decided that that's what I wanted to do. But when I was about Year 9 that's when I got a bit of interest in physics, and about Year 10, 11, that's when I thought, that's it, physics teaching.

FB: So what can you say about physics education back then and the physics education now in terms of contents and ways of teaching it?

PT2: Some of the ways of teaching it were more boring in the olden days. Now it's more interesting and relevant but at the same time the content has had to be reduced because the time allocated to teaching of physics in high schools has been reduced. Now as I said, before in Year 9 when I was at school we did physics as a full subject that was six lessons a week. Now we do general science in four lessons a week so the amount of content that's covered in schools these days is a lot less.

FB: Now picking up on what you said about physics back then is more boring, would than mean more traditional?

PT2: Yes, traditional in that respect. It was lecture talk, a few experiments, and that was it…and then study up for the exams.

FB: As a physics teacher what do you tell your students about physics and how do you teach the subject?

PT2: Well, that's a big question. It's more pupil oriented nowadays. I get the students to do the work and I just guide them through…through the work after a bit of a lecture to start them off and get them…give them basic information. But then afterwards it's a matter of problem solving and looking at situations that are presented, trying to visualise and then come up with solutions and different ideas. Experimentally, it is more investigative rather than follow through a set procedures; you do this, this, this and that, and then you fill out the graph and so forth. Now it's more, "now what about if you change this?" or, you know, just to investigate the problem.

FB: Now for my last question, do you encourage your students to at least do a course related to physics or physics sciences and how do you do this?

PT2: Ah, all the time whenever any opportunity arises. Now we talk about situations such as in South Australia where we're heading towards a bit of a boom, and therefore, there's a need to have mining engineers and civil engineers and so forth, so encourage the students to consider physics and chemistry as course choices so that when they graduate in five years time or so, there will be jobs waiting for them, and with a bit of enthusiasm I try to develop them in students all the time.

FB: Excellent! Thank you very much.

Transcript of the interview with Physics Teacher 3 (PT3)

FB: Good afternoon _____. Thank you very much for your time this afternoon. What got you to study physics? Who or what influenced you to study physics?

PT3: It was probably in my first year of my university studies. I was exposed to first year maths, first year chemistry, first year biology, first year physics, and of each of the disciplines I found the physics particularly interesting, and the lecturer in particular was enthralling, his relevance and his own personal enthusiasm was probably a motivating factor why I continued with it. Also, having studied and then sat in the exams I found that I was succeeding in the particular field. So I guess the success then nourished my pursuit in that area, plus also developing my own interest in the area that were fostered by that lecturer.

FB: Thank you very much. For you, what is the role of physics in our society, or how important is physics in our society?

PT3: It's multi-faceted that question. Probably at a fundamental level, just generalised skills for the general populace there's a level of physics that's required just to have…just to be able to survive in everyday communities whether it's understanding the electricity in your home or where the power is being generated or the fuel consumption of your vehicle, the breaking distances right down to being required to answer some of the social issues, etc. and meeting us in today's world, you know, nuclear energy, solar energy. In other words, the population needs to be informed decision-makers, one on political, economic, social, environmental issues, and the other thing is that to…if you have an understanding of a particular phenomena or event, it gives you a greater insight and therefore an enrichment in that plus also if we are going to find those who are going to solve problems that are going to arise in the future you have to have those with the knowledge base to work from so that they can, not only see that there is a problem, but also see that perhaps there's a solution to come.

FB: Thank you. Picking from your answer to the first question, was it also because of the relevance of physics to our everyday living that interested you to study physics?

PT3: No, it wasn't as such. My own secondary education was probably bereaved of good examples of physics teaching and also a contextual approach. So my perception at high school was that physics was just a…applied maths. And I considered it more as a maths situation rather than having an in-depth understanding of the world around me or establishing any joy, and the teacher was specifically teaching it as problem-solving not as in general interest in concepts or issues that were based around the society at the time. So it wasn't until I got to the university where my eyes were perhaps…so that I could see instead of look.

FB: What got you into teaching physics then?

PT3: Uhm…what got into teaching primarily was an English teacher; and watching that English teacher in the classroom and seeing his enthusiasm and his joy in sharing his knowledge and also developing students led me to want to be a teacher and in fact I went to university with the objective of becoming a Chemistry teacher. Reason being instead I found physics very boring. However, once attending university and seeing the physics, I

swapped both mid-stream and then decided to become a physics teacher. One, originally because I was always going to teach that; two, then it was because I became enthralled and excited by physics.

FB: You've been around teaching physics for a while now. What can you say about the physics education back then and physics education now in terms of its contents and the ways of teaching it?

PT3: The way in which I had learnt physics was that, one, you needed to do both maths 1 and 2, and it was a very mathematical approach to physics. It was very much problem solving by pure calculative methods. There's very little descriptive work within the core. There's very little expression of your understanding and there is no justification of the physics that was taking place to that you are all using. In the last 30 years I have seen different approaches, many of them from top guys in positions from SAABSA. One had been instead of a conceptual approach; it used an experimental approach where your physics understanding was developed by experimentation. These days with a more contextual approach and it shows greater relevance; it's more humanistic; there's more social and environmental impact in it, and the physics in context means that there's greater relevance. It has been de-mathed effectively so that it is more accessible to other students so instead of an elite group who are your maths, chemistry, and physics students, it's now more accessible to those who don't take high level maths. And, I think also because it has become more descriptive, it's more relevant as physics because you get to describe your physics but with justifications by theories, concepts, law, etc. It's being utilised within the syllabus so far more relevant, far more accessible.

FB: So as a physics teacher, what do you tell your students about physics?

PT3: Probably, if we are looking for a catch-phrase the one thing that I want students to come out of my classroom is with, "I want to know why." It's more about why things do the things they do. The concept of natural science is to find the nature of things, so I want them to question what's out. When they leave the classroom I want them to question what's around and question every time even if it's known fact. Once they have developed that enquiring mind, then their interest will be stimulated every time that they look at a problem. And so fundamentally, I want them to leave and see physics outside the classroom and to have that enquiring mind where they want to seek the answer to it.
FB: Thank you. Do you encourage your students to at least do a course in physics or something related to physics?

PT3: At university?

FB: Yes.

PT3: I work in a school which has a slightly different clientele. The directions for their future vocations are often pre-determined by all sorts of influences including family, friends, economic rationale, so even though I outline what are the courses that are available, what are the vocations that they could pursue that would utilise physics and show them the beauty of the physics that would be in that particular area, the vocations will drive what course they will take.

FB: Thank you very much.

Transcript of the interview with Physics Teacher 4 (PT4)

FB: Hi _____. Thank you for your time this afternoon. I've got 6 questions for you, and here's the first one. What got you to study physics? Who or what influenced you to study physics?

PT4: Well, how are you Francis? (laughs)…That's going back a long while. Now, I think probably when I went to the university initially as a student teacher at a teacher's college, I actually studied biophysics at university and one of the main reasons is that was uh, broad subject area. In other words, I booked at biology, physics, chem., and maths. And I thought, well, that would give a fairly broad knowledge base for any teaching career and that's what I chose to continue with. So at the time, probably it wasn't just physics, but any science-base subject so that uh…well, I actually initially started teaching chemistry; a little bit of maths, then I went to chemistry with some physics. Now these days over the years, it has become mining physics.

FB: Thank you. Now, for you, what is the role of physics in our society? How important is physics in our society?

PT4: Well, I think we're talking as a school-based thing to Year 11 and 12 students. Year 11 students get a basic idea of what's going on in the world around them. They can a basic idea of a few experimental techniques. In other words, get to use a screw driver or something like that and be able to have some idea of electrical circuit and might not have to play with it or a little bit, or whatever. So some of them more of a safety guidelines than anything. Now other than that some broad knowledge as we do in Year 12; things that they use everyday like the DVD or the CD player; the…your television, at school your photocopier your mobile phones; have some idea of the communication system and…some of the basic fundamentals, I suppose, of physics that are, I think, probably used these days in all the science-based subjects. Other than that, yeah, I figured it is the importance of kids just to be aware of things around them. To be able to make informed decisions on those sorts of things like global warming…and sort of be aware that out there there's a big universe, and on earth some idea again of communications; optic fibres, radio waves, and etc.

FB: Thank you very much. I am assuming you have been teaching physics for a while now. What got you into teaching physics?

PT4: Long while now. What got me into teaching physics?... Probably, again just a matter of circumstances, well, evolving…probably evolution more than anything. So as I said before, I started off mainly with chemistry and I did science, a bit of maths, then sort of…I went into teaching both chemistry and physics, but these days that's sort of not the system at schools. They tend to major in one or the other, so I tended to lean in latter years…well I suppose the last 20 years into physics. That's probably the thing I enjoy the most out of all the sciences even though I studied biophysics that was in the department of biological sciences. These days biology is probably the least of my favourite subjects; physics would be first, then chemistry, then biology is number 3 on the list.

FB: What can you say about the physics education back then and the physics education nowadays in terms of its contents and the way of teaching it?

PT4: I'd say the main change in the syllabus over the last 30 years…35 years was a lot of the content is still quite similar in actual fact. But where the syllabus is changed is more looking into applications. These days we're trying to make some relevance to actually what we are teaching. So, in other words, I probably mentioned a bit of that earlier in uh…what are the kids get out of teaching of learning physics was of how physics is done and that is in its applications. There's more relevance…more relevance to what is going on in the world. So looking at things like satellites and communications and photocopiers and electric fields or moving coil, loudspeakers and electron microscopes…to all the application areas. So, again, probably somewhat difficult for the kids to pick up because you don't have electron microscope on your back doorstep or your don't have lots of those things like cyclotrons and all that…You talk about these things and the are obviously used all the time in hospitals but you don't have ready access to it. But as far as syllabus goes even though a lot of its topics are much the same, the changes would be in trying to make relevance in today's society and what's going on.

FB: Now, picking up on what you said, in terms of the volume of the contents are you saying that there is less nowadays than back then?

PT4: I would say to a degree there is a bit less, yes. We did have for many years a section on kinetic theory of gases which has been out now for the last probably 5 or 6 years. Now that has been replaced with other things but not to the same degree. I'd say that even though there are other things that'd been introduced, probably not to the same level…not to the same extent. The content is probably a little bit less, but in other ways probably a little bit more demanding.

FB: What do you tell your students about physics? How do you teach the subject?

PT4: Well, teaching the subject, I try to make it enjoyable to the kids. I try to mix up basic work ethics with a bit of fun. Consequently I also make my kids realise that when they first do physics they are the ones who pick up the subject even though it is considered to be one of the more extreme of the Year 12 subjects, it is one of the priority and also externally examined subjects making the kids keep in mind that they are ones who selected it and obviously a name in mind and if they want to continue at university level or some tertiary level and their aim is to be, whatever it may be, doctor, engineer, pilot…these days we get the story that the tiny assumed knowledge they require to do the university courses like pre-requisites. So I think I make the kids aware that assumed knowledge means assumed knowledge so is there's someone or some students around that haven't done Year 12 physics, they're going to find First Year University physics extremely tough. So I try to keep them on track and try to make the subject enjoyable. I know that I know the content very well, of what's in the syllabus and everything else, so we tend to get on very well, thanks very much. One of my pleasures of doing it actually is that I seem to have a very good rapport.

FB: Now this is the last question. Do you actually encourage your students to at least do a course related to physics if not physics courses? How do you do it?

PT4: So when they do go to university?...Well, I tend to just suggest that they do the courses that are appropriate for their career choice now…and all the time, even on a

school-based thing saying to kids who are in Year 10 thinking about going to Year 11, I still believe that doing maths, physics and chemistry selection keep your options open. I've always said that to kids in Year 10. If not sure, if your science…you're somewhat science orientated, give that a go and see how you go and same with 11 to 12; don't just do another subject that's outdoor education or whatever because it's considered to be easy, or they're going to get better results; keep in mind what you're going to do and what your career choice is and in the long run nothing's easy so put a bit of work and a bit of it, and then you'll get there. So as far as the university selection goes I mean it depends on what they want to do but also keep in mind right the way through keep your options open.

FB: Thank you very much for your time.

Transcript of the interview with Physics Teacher 5 (PT5)

FB: Good morning, _____. Thank you for your time today. How are you?

PT5: Good, thank you.

FB: I have six questions here that will serve as the link to what I am trying to find out in my research. My first question is what got you to study physics? Who or what influenced you to study physics?

PT5: Well, my Year 11 and 12 physics teacher is probably my biggest influence. She was young and enthusiastic and I really liked the way she taught and found her easy to understand. I didn't have any intention to going and doing any physics because I wasn't going to go to uni but right at the end of Year 12 the teacher encouraged me to do uni so went to do teaching and tried physics because it was my favourite subject.

FB: Thank you. As a physics teacher, for you, what is the importance of physics to our society? What is the role of physics in our society?

PT5: Well, extremely important with regard to engineering, of course. But I probably enjoy physics more just as a way of observing the world and I am really interested in astronomy too so, in that regard, so I just like to know how things work and why things work and…and that sort of affected my teaching too. And perhaps physics enables citizens of our society to become informed decision-makers with regards to some current issues like global warming, etc.

FB: What got you into teaching physics?

PT5: Like I said, I was pushed by my teacher at school. I didn't really know what I wanted to do at uni so I put down teaching and just thoroughly enjoyed it when I got into it. So that was the main reason because I pushed into it but I do love doing it.

FB: What can you say about the physics education back when you were a student at school and the physics education nowadays in terms of its contents and the way of teaching it?

PT5: When I was a student, I know we didn't do any practicals at school because we didn't have any equipment so that's a big difference. I can do a lot of stuff with computers and use a lot more technology nowadays than we had back then. But I think the girls enjoyed being engaged in the practicals but I also think they enjoy the…the…it seems to be a subject that get students to…are keen to learn and want to learn it rather than being a subject that they have to do because there's nothing else to do so I always get a good bunch of students through who like learning.

FB: Do you think physics education nowadays is more context-based or more problem-based?

PT5: I probably don't focus on problems within the world, I focus more on issues…I do sort of work to the text related to things happening in the world that aren't necessarily problems but innovations and that sort of things.

FB: As a physics teacher what do you tell your students about physics? How do you teach the subject?

PT5: I start by making them aware of things around themselves, if we are doing projectile motions; we probably throw a few balls around the room and that sort of thing; look at how they're moving and then work out why they are moving like that. When we, you know, do topics in electricity, we usually start off with…something happening, and then say, "Why did that happen?" So I sort of come from that context to look at something in the world, and then, alright, let's explain that now.

FB: Do you encourage your students to do at least a course related to physics if not pure physics when they go to uni? How do you do it?

PT5: I suppose push more of that at Year 11. The push there is I really try and make them enjoy physics so that they will continue with it, and then, you know, we talk about different careers and so on that involve physics. But probably I don't push them towards it. I just, you know, keep them knowledgeable about it, encourage them in whatever they choose and really try and make it fun so they like doing it so then they'll choose it because of that rather than being just a necessity for a course.

FB: Well, thank you very much for your time.

Transcript of the interview with Physics Teacher 6 (PT6)

FB: Good morning, _____. How are you?

PT6: I am good thanks, Francis.

FB: I have six questions for you. My first question is what got you to study physics? Who or what influenced you to study physics?

PT6: I think it was probably my Year 10 science teacher. He always said I had potentials for science in particular and Year 10 being general science class, we covered chemistry, biology and physics as well, and the third area I tend to do well in and he encouraged me to do it in Year 11 and Year 12.

FB: Okay. Thank you for that. For you what is the importance of physics in our society?

PT6: It just covers so many areas. Biology and chemistry are so specific. Physics can range from anything from quantum physics to astronomy, astrophysics…it's just so broad that it covers a lot of things so…and the discovery is continuous; there's always new physics coming out and it's always interesting.
FB: So do you think physics is a major component to the science literacy of the people in our society?

PT6: They probably don't know that it is, but the amount of everyday physics is so enormous.

FB: I know you have been teaching for some years now. What got you into teaching physics?

PT6: It was basically during the first year of my science degree and physics was the area I excelled in and I went from there. I did my physics program and then did a post grad education degree and physics was my major.

FB: What can you say about the physics education back then and the physics education nowadays in terms of its contents and the ways of teaching it?

PT6: When I was a student?...Uhm, there's a lot less content now, I am aware of that; Most of the topics in my Year 12 physics course are no longer taught but most of the physics areas are probably the same. It hasn't changed all that much. We still cover the same areas, maybe in more detail when I went to school as opposed to now.

FB: I have been hearing comments about the physics contents as too much to handle now. Do you think it should be stripped down further?

PT6: Cut back again? I think that's going to limit the students especially when they get to university because university assumes a certain amount of knowledge in physics if you are going to study it so without that background they are going to be lost.

FB: As a physics teacher what do you tell your students about physics?

PT6: I am very enthusiastic in the classroom; they laugh at me a little bit because every time they get around to my topic I just happen to be very energetic about it and I always….I'm very biased and tell everyone to study physics.

FB: Do you encourage your students to at least do a degree or course that have something to do with physics if not pure physics? How?

PT6: I like to tell them stories about when I was at university studying physics and how exciting it was and how much I like physics, and how much physics relate to their everyday life and basically try to encourage them that way and…I still leave the decision up to them, of course, as being what they'd like to do when they leave school but I am always pro-physics.

FB: But what do they say when you tell them something about physics?

PT6: A lot of them say it's very hard and was in fact too much maths but some of them do enjoy it.

FB: So do you think the mathematics component turns them of?

PT6: Some of them, yes. It works both ways. One of the physics classes here, they enjoy conceptual physics a lot more. The physics class that I teach, they don't like the conceptual part of it so much they prefer the mathematics part of it more.

FB: Picking up from that answer, what can you say about teachers commenting on too much conceptual physics is not good for students?

PT6: I think it should be equal. They go hand in hand – conceptual physics and the mathematical applications of it as well.

FB: Okay. Thank you very much.

Transcript of the interview with Physics Teacher 7 (PT7)

FB: Hi _____, how are you? I have six questions for you. These are follow questions to my questionnaire survey questions. The first one is what got you to study physics? Who or what influenced you to study physics?

PT7: I had two teachers at school; one is a maths teacher, a superb maths teacher. His name is name is Fred and he…he got us really inspired with mathematics and got us to see that mathematics was not just an example of something we had to do at school but…but really could go on and so I got thoroughly inspired by him. The other chap was a chap named Peter who was a physics teacher. He was a very exciting, dynamic, and very passionate physics teacher and got us to love the subject; got us to see the subject in the real world and…and I suppose this inspired me and then at university I continued to study physics and mathematics. And I was inspired more then by what mathematics in particular could do, and the way in which mathematics could be applied to the real world so I fell at applied mathematics and is essentially which the applied mathematics and physics kind of combined, and so I enjoyed that. And I suppose it was that influence of those teachers and the work at the university that made me think I'd really like to do the same thing for other kids.

FB: Thank you very much. What do you think is the importance of physics to our society?

PT7: Physics is absolutely vital. To understand the relationships between bodies and forces; to understand the way in which the natural world works is absolutely vital for us to understand how to solve the problems that face our society. We are never going to be able to understand and fix global warming; we are never going to be able to understand and fix any of these problems unless we understand physics.

FB: Excellent! You have been teaching physics for a while now. Have you always planned to become a teacher? What got you into teaching physics?

PT7: The plan to become a teacher, and in particular to teach physics really evolved when I did my honours degree. I just missed out on the opportunity doing a PhD in applied mathematics and so the choice at that stage in my life was either to be a teacher or meteorologist; meteorology being the opportunity of bringing together physics and mathematics. And I agonised over that for a while, and in the end I decided that whilst meteorology is a really interesting and fascinating career direction which I would've loved, I also needed to work with people. And that was probably the thing that has won me to…towards teaching.

FB: So, if you are given the chance, are you going back to meteorology or stick with teaching?

PT7: I'd probably stick with teaching now. I think it's great fun to look back and see how the kids that you've taught have moved on. You know, I look back and think for example that one student I taught is now running a research institution in Europe. Another is the launch director and in-charge of the Chandra Telescope. So you look back and see that, you know, you had at least some influence on some of the students who have gone to do some wonderful things. Another one of my students is a professor of

Applied Mathematics. So, yeah, it's terrific to look back and see that you've had some influence on these students.

FB: That's good! Now, what can you say about the physics education back then and physics education nowadays in terms of contents and the ways of teaching it?

PT7: It has changed a little bit. Obviously computers have changed the opportunities that we have to explore ideas and concepts. Some of the equipment that we get to use is a bit more sophisticated and allows us to dig in to some of the concepts more easily. Certainly from the perspective of the students having...our calculator which when I did it we had to use a slide-rule, you know. It frees us up from the drudgery of some of those subjects and allows to get in to the meaning, which is terrific, so…I think, the other thing is probably there's been a strong push in physics for conceptual understanding. The work of Paul Hewitt for example in America, has given us the opportunity to get students excited about the work before they get to bog down in the mathematics and that's been a great release; it's a great opportunity to get students excited.

FB: What can you say about the contents, is it more now, or less?

PT7: The content is reduced. It's fair to say that there's been a significant drop in the amount of content and the demand…but I think it probably means that the students understand the material rather better. I suspect that going back 25 years, they might have been exposed to more physics; they might have had to solve a wider range of problems, but I don't think in the end they knew any more.

FB: As a physics teacher what do you tell your students about physics?

PT7: I try and let them know that physics opens up a wide range of careers. I try and make them know that physics is vital to a range of different disciplines and it is a wonderful, if you like, subject to open up possibilities for their lives and so on. But I am also conscious of the fact that there are some fantastic opportunities out there for students and encourage them to explore those…expose them to those as much as I can.

FB: That means you also encourage them to take a career path in physics or physics-related courses?

PT7: I encourage them to consider it. There are lots of other opportunities and lots of demands on students but at least I…my thinking is that they should at least seriously consider options in that direction and explore them and make decisions based upon a good knowledge of what the possibilities are rather than just not even bother.

FB: Well, that answers my last question then. Thank you very much.

Transcript of the interview with Physics Teacher 8 (PT8)

FB: Hi _____. How are you?

PT8: Hi Francis! Good, thank you. How are you? It's good to see you.

FB: I am good thanks. Thank you for this opportunity. I have six questions that serve as a follow-up to the questionnaire questions. My first question is what got you to study physics. Who or what influenced you to study physics?

PT8: I found physics interesting since I was a high school student. So I started finding my interest in high school basically, and I thought physics was a course that could be continuing, you know, so I could continue more and more…to explore more. And I found it challenging and I have always loved challenges. My interest is always towards sciences so I picked physics because, as I said, I found it interesting and it could satisfy my curiosity about, particularly about space and atoms…so I loved it from the very beginning.

FB: So did you also find physics as some sort of a course which is "Jack of trades" where you can do a lot if you know physics?

PT8: Yes, actually, yes I know in terms of careers…are you asking me in terms of careers or in general?...

FB: In general…

PT8: In general yes, because I always wanted to understand what's going on with the issues like in, for example, nuclear power; when we talk about nuclear power on the news I want to understand what it means.

FB: What do you think is the importance of physics to our society? Knowledge of physics, I mean, to our society.

PT8: In particular, in decision-making. I would say if you know some physics…some general physics you can be a better decision-maker as a member of society. For example, is nuclear power a good option for South Australia? So, in terms of generating the power or getting the energy from hot-spots because we know we have a lot of hot-spots, right, in this area? So is it a good decision for the government to make? You can be part of it as a member of the society if you understand…you know. Otherwise, you just sit and watch other people decide on the issue. So the best thing for me is the decision-making.

FB: What got you into teaching physics?

PT8: I enjoyed physics as a student as I have said. More than that I enjoyed to deliver my understanding to other people in physics as well. So always enjoyed teaching generally speaking so then that could give me a nice combination; teaching plus enjoying physics at the same time. That is a win-win situation for me and I just got into teaching physics afterwards completely.

FB: I am assuming that you did your physics education some time ago. So what can you say about the physics education back then when you were still a student and the physics education nowadays in terms of the way of teaching it and the contents?

PT8: I always joke about it with my kids; I say wherever you study physics it doesn't matter you fling up an apple in the air it comes down. So physics is physics. But, I understand your question in terms of the more traditional education and modern education. In those years, we mostly did the theory work and it was lot more theory and less practicals, number one. And number two, we didn't go through a lot of applications of physics in high school in particular. We studied, say, Newton's Laws, we studies Kinematics, we studies Atomic Physics in Year 12 but we never understood or even…you know, there was no emphasis, no peak emphasis on the application of those fundamental concepts. And these days, our curriculum in particular these days, is that you start with the theory first, we try to understand the concepts and you make it simple. For instance, Newton's Laws are simple to understand then looking at those laws and those fundamental concepts into a more complicated and advanced way, is very interesting because then kids can see how you can apply physics in a particular application. So I can say the main difference is to study the application of physics in society; that's the main difference so it means that we decrease the amount of theory. Instead, we put a flavour of more practice into what you understand in that level. Focus on relevance.

FB: As a physics teacher what do you tell your students about physics?

PT8: Physics is good (laughs)…and fun! And I always say physics is easy despite many people thinking that physics is hard…difficult. No, because you can relate…I always tell them you can relate to physics in daily life a lot. You can look around and you can find physics everywhere. So physics is easy to understand; it talks about fundamental things in the nature and it is fun to do.

FB: Do you encourage your students to do physics or physics-related courses when they go to uni? How do you encourage them?

PT8: I do absolutely encourage them. As part of that encouragement, I usually take them on an excursion to the university. I want to look at the real people in the there…the real researchers in there and find out what they do as real people and how they make decisions, alright, in that...in their own area. So, then, usually when we come back from the excursion, you always have few students coming to you asking what opportunities…more opportunities, and how to apply, for example, for the scholarships available because usually there are scholarships available in physics departments for good students. So I encourage them, in particular, in Year 11 to continue into Year 12 first in physics. So to make their options more open in order to do, you know, more courses in university because too many…like engineering course, they do need physics so even if they don't want to do physics in particular in university, they can still do physics-related courses like engineering, etc. And, I usually tell those kids who are not sure about their options, in particular, if they even don't need physics in the course that they are going to do in the university, I say look at other things like, number 1: give yourself general understanding of physics in high school because, then as I mentioned earlier, when you hear things from the news for instance, about different issues, for example global warming, then you have an essential understanding about what's going on around you. You can share your ideas and you can understand what they talk about. And, the other

thing could be because physics is challenging and challenge is basically good for you so you learn how to solve problems in daily life as well, not directly but indirectly. It teaches you how to deal with problems with an approach in order to solve it. And again, physics will make you a better decision-maker in many areas…many issues as I mentioned before and overall it can help to satisfy your curiosity about the nature, for example if in the future your kids will ask you about things, about what's going on in the moon, there's a chance that you will say, "I don't know"…At least you will have something to tell them and you have a general and basic understanding of those important concepts and you can satisfy your curiosity. So, I think those reasons actually suit many cases with many students who are not sure in Year 11 to continue in Year 12. And of course probably because of this we generated another class of Year 12 this year. Apparently it works.

FB: Picking up from your answer to the question, the first part of it, how do students react when they see real physicists in the university?

PT8: It's very interesting to them because before they see them they think that physics researchers have horns (laughs). They see that they are real people and especially mostly working in closed…you know, behind the closed doors, and they find it fascinating and that's possibly one good reason for them to come and ask about the scholarship and, you know, ask about careers in the future. So they find it exciting and they think they are smart people. They are, aren't they? (laughs)

FB: Thank you very much for your time.

Transcript of the interview with Physics Teacher 9 (PT9)

FB: Good morning _____. Thank you very much for this opportunity to have a chat with you today. How are you?

PT9: I am very well, thank you.

FB: My first question for you is what got you to study Physics? Who or what influenced you to study Physics?

PT9: Well, that's a long time ago now actually. It's hard to remember but I always loved mathematical side of Physics because of the algebra and just the plain solving of problems, etc. Who influenced it? Well, uh, probably two teachers that I had at my high school in Findon High School in the 1960s (laughs) by the name of Peter Toadner and also Peter Toadner went on to actually run a laboratory in the Flinders University and he was doing some very, very special experiments down there which he shared with the scientific world throughout, you know, the world. And the other fellow…I can't think

of his name at the moment, but he went on to become a Principal at the PAC…Brian Webber. And they were two very interesting fellows; they made Physics very interesting because they made it more applied than just theoretical, and yet I like both sides of it…and so, I guess that that was my first love of Physics because I enjoyed it and I enjoyed the blokes who taught me that at that stage and that led me into university with Maths and Physics.

FB: Thank you very much. Now, for you what the role of Physics in our society at the moment?

PT9: I think that's far reaching; that's almost a difficult question in a sense because you can look at the technology that you are recording on at the moment, and of course you think of all of the Physics behind that and of course the development of the plasma screen TVs and mobile phone technology and so on…and yet there's also of course the application in perhaps less technical places as in the jib of a crane, and the way that the crane can stand in something like Morphett Street at the moment in the city, and uh…and be well balanced and completely safe. Of course, you have to have a thorough knowledge of Physics to be able to build that crane let alone to actually work it.

FB: That's great! So what got you into teaching Physics then?

PT9: Again, just my love of it and you know I enjoy the students that I have here; I enjoy trying to get them to be curious about the world of science in particular, and I think that Physics is a great vehicle for which you can nurture that curiosity. I also happen to not only teach here but I also have a, uh…student that I am tutoring Physics, and…uh…they aren't allowed to go a little bit outside of the, uh, let's say strict curriculum if you like, and just give a lot of background knowledge and then look for more and more applications of the theoretical side.

FB: Thank you. Now you said you did your Physics back in the 1960s, and now it is 2008, so for sure you can compare the Physics Education back then and the Physics Education at present in terms of the way of teaching it.

PT9: Yeah, as far as I am concerned, and I know that there are lot of people who perhaps, are still in the 1960s style of teaching...but I like really to get the boys to appreciate the hands-on approach and I might be…fortunately here we're very well set up and I might be talking about a particular thing and then think a particular concept and I might think to myself…they cannot get a real appreciation for that unless I show them. And so I walk out and I get, for example we might be dealing with beats…beat frequency…and it's only just basically in the store room that I'll be able to pick up 2-256 Hz tuning forks and bring them out and I can have that set up in absolutely no time at all, and I can show them that and demonstrate it to them. That's the thing that I think is uhm….reaches the students more than anything and that is the…they are just the hands-on that either I demonstrate it to them or they demonstrate it to themselves by doing particular experiments and that practical side of things I think is the…is where Physics

Education has probably developed more and more because we are doing…I'd like to think we're doing more practical work.

FB: Excellent! As a Physics teacher what do you tell your students about Physics?

PT9: As much as I can. Certainly, to try to get them to be entertained by it, and then secondly, to see Physics outside of the classroom. We talk a lot about inertia and the safety features of cars as in crumple zones…and you can see I've got my…the front bumper bar of one of my cars up here in collision corner…and we talk about why that happened…as in you know the friction between the tyres and the bitumen and the reaction time of the driver and the braking of the car and then the absorption of the impact…you know crumple zones and now, of course, we've got airbags in cars, etc…and a lot of our students here, of course, being the age that they are and all boys, are very interested in cars and it's very easy to entertain them and to actually get them to think about Physics that we do here in the classroom, outside of the classroom when you start talking about their cars.

FB: Do you encourage your students; let's say when they finish high school, to continue on getting or doing courses related to Physics – something like engineering?

PT9: Yes. Well, again, we've got several displays up around the room that…that try to do that for the…for the boys, and the one that I've got in the corner there…the red one, is…actually tells them what jobs are available for those who study Physics. And that is just at a…at a relatively fundamental level to a more advanced level, and that poster is…is talked about quite a lot in fact in class and during break times of course when students say to me, you know, well, we're learning about the conservation of momentum, you know, where can all of these sort of stuff lead and then they can refer to that, and just develop their interest and hopefully dangle the carrot in that respect.

FB: Excellent! That means that's some sort of a brainstorming facility.

PT9: Oh, absolutely! Absolutely! I think we're doing that all of the time. Inasmuch as a lot of the…a lot of the posters we've got up here. Now admittedly some of them are influenced by my love of Holdens, but the posters like the electron micrographs there, the x-ray chart, the weather and communication satellites, etc., a lot of students have actually come and stood in front of them and taken time to actually read them and then come and ask about them. And I think that that's the beauty of those sorts of displays; to encourage their curiosity, and of course, show them that there is a career in Physics that's really worthwhile.

FB: Which is what we need today because less and less people are taking Physics…

PT9: Yeah, that's a bit of a shame. We have also in the past years taken a group of students who are really, really into Physics and looking for a career in Physics to the

eastern wing of the Royal Adelaide Hospital. In the basement there they do a lot of cancer treatments using linear accelerators and of course once they see the theory that we talked about in the classroom actually applied and they meet some practicing Physicists, I think that that has a…has a huge impact on them.

FB: Well, thank you very much for your time today, Robin.

Transcript of the interview with Physics Teacher 10 (PT10)

FB: Good afternoon, _____, and thank you for this opportunity today to carry out this interview with you. How are you?

PT10: I am very good, thank you.

FB: What got you to study Physics, and who or what influenced you to study Physics?

PT10: It goes back to my high school experiences but I found that spelling and writing essays and all that sort of things wasn't my style; maths and numbers were more on the line so I drifted towards what we call now as 'suicide five' – maths 1 and 2, Physics, Chem, and I actually did English…uh, so I drifted that way, but I was also curious about why the things happen. And so that was another aspect to the Physics – why is the sky blue; why is the sunset red, why apples fall down on peoples' head, those sorts of things. So that is where I started. I then…actually teaching wasn't my first career choice, it was becoming a pilot. And I was more into perhaps applying into the engineering side of things but although I got through the exams I was one of the top ten percent so others managed to fill in forms and I just happened to tick a box at teaching, so I went that way. It was sort of a second choice. And of course, Maths, Science backgrounds are then just configured to pursue that. Then it was the Physics that I followed through. I guess at school it was my Year 12 Physics teacher that was really the one who sparked some real interest in Physics, and that got me going. Then when I went on from there, a previous Headmaster of PAC by the name of Brian Webber was the person who was a big influence. Brian Webber and Richard Paam were two that I had a lot to deal with and so they were mentors, I guess, in those days that got me into…to follow through with the teaching side of Physics and be able to combine the, I guess, academic part and be able to transfer that knowledge and give it to other people and try to instil a bit of interest in others.

FB: Any influence from your family?

PT10: No, not really. The family was more supportive in whatever I wanted to do, but there was no influence to go any particular direction at all.

FB: Okay. Thanks. For you, what is the role of Physics in our society?

PT10: Physics is, to me one of the key aspects of anything we do. People want information. They want to be able to…we need people who can critically analyse what is going on and whether it would be anything from an article on a paper says…the

government says we should be doing A as supposed to B. There has to be some sort of critical scientific literacy that people need to be able to sort the 'wheat' from the chart. So that's a key part of it. So that is more of a general aspect. But then again we are also looking at going forward all the time; we…information is increasing at a phenomenal rate, so what we need is we need people who have the skills and the understanding to make sure that what society wants, society can cope and can deal with, and can have later. But the skills from people, and there's also the education and the knowledge of the masses that's required to keep us as informed society, so we don't have the world pulled over our eyes. These are two major parts that I see.

FB: Now you are teaching Physics; what got you to it?

PT10: It was really, I guess, I fell into teaching like I explained earlier. Uhm, but it was mainly Brian and Richard that got us into the teaching on the secondary side and the support that they gave us through the system. Now I started teaching uhm,…you mentioned Clark Ross…I taught with Clark in New Zealand in 1980….a long, long time ago…uhm, and so part of it, I guess, uhm was also the availability of positions, so we started there and then we moved in to PAC for a while but then I actually got out of teaching. I stayed in the education side of things while I was working with organisations that did training and development within companies, and I was doing management training…that sort of thing…but….that wasn't really my thing, although education-wise, I drifted back into teaching again. So it was a conscious decision to come back into it and what I found is that at the secondary level I have more influence than a…an adult. Adults have made a decision about what they are going to do, and they want information to be able to do whatever it is that they want to do. At the secondary level, you can actually have an influence on where people go and that has more of an appeal to me so I am not quite sure what the original question was now, but it's the…Physics is one part but the other part is being able to influence kids and increase their literacy and also influence people so they'll go on and make a difference to society and the technology-Physics-Science area.

FB: And, of course, aside from that, I am sure you enjoy teaching Physics as well.

PT10: Ah, of course, well, what I like is the interaction….the interaction with people. Although you may have…for example I've got two Year 12 classes right now…and I taught the Year 12 IB and Year 12 SACE for years but from one year to the next, from one class to the next, no two lessons are the same because of the part of the people and I tend to teach people through the subject as opposed to having the medium of kids to teach the subject, if that makes sense.

FB: The next question will ask you to elaborate on that further, so and what do you tell your students about Physics and how do you teach the subject?

PT10: I try and do it more on a discovery basis. Here's a problem, what are we going to do to try and solve this problem. Here's a phenomena we are seeing now what can we do to explain it? If you talk about the changes I've seen over time…what previously has happened over the years, it was "here is concept 1, here's concept 2, here's concept 100", we just go through 1 through 100 and at the end of it we'll do an exam or something. I am finding now that that doesn't necessarily suit the kids of today. They want to know why we're learning these. So we then start to go off on a side track and say, "ok, we may

now"…and this is a part of the SACE syllabus has done, is instead of just coming up with the concept, we look at how it is applied to something. And so what we try and do…what I try and do anyway, is look at the concept and where does it fit into the real world…how is it relevant to the student today and their real world, rather than coming out of the point of view, "this is important, we must learn it". And that tends to try…well, what I am trying to do there is get this hook so that the kids is at, "well, I was always wondering about that and now I found out, what else can the subject offer so that I can find out other things and try and get a hook in that way?"…rather than saying "I want to be an engineer, okay we better learn these facts", that sort of way. Because what I find now is because information is so broad, there's no way you can learn everything. So what you have to do is you've got to be able to have a skill set to be able to then problem solve. It was put to me before that years ago we were information poor but were…..we were information-poor and question-rich, but now information-rich but question-poor. Before, there was only this amount of knowledge, now there's so much but what we have to do is not say, well we can Google anything we like but now we don't know what is correct and what isn't correct. So what we have to be able to do now is be able to space the question correctly so that we get the right answer and so now what I am trying to do is also develop that skills-base so that the skills can be used to whatever situation they may be in whether they are going on to the Science or Physics, or whether they are not.

FB: Do you encourage you students to at least do a course related to Physics when they go to uni?

PT10: What I have always done when…kids have to do Science at Years 8, 9 and 10. Once they get to the next stage they can make choices so what I then do is I say okay something…Science will always explain the why of the world if you have Biology, you can always take that up later. Physics and Chemistry is a few building blocks; you've got to have the foundation down before you can actually build the walls. So that you don't shut the door on any possibilities, continue with Physics…and I also mentioned Chemistry, but only as an afterthought. And then when they go on further we then…I don't necessarily "push" Physics and say you must do Physics, but what I do say is look at continuing something with the sciences at university. Science will always…if you do First Year uni Physics for example, and then you go on and do something in Chemistry, and you do something elsewhere that's fine, but then you have got to learn certain skills that are going to be useful. I have mentioned to students that get into…they want to do journalism…want to do law. It will be along the lines of, "okay you want to do law, well, it would be useful if you…you know you're prosecuting something because of DNA evidence, it's useful if you actually know what DNA and genetic code and what all this is about", so it's worthwhile going on with the science. If you are doing Journalism and end up reporting on something, you are going to need to have that science background. So I don't necessarily push the Physics as such, but I do push the science and say there is this particular way of knowing and no matter which career path you follow, that way of knowing is still going to be of benefit to you, and then if they then start talking about a science career then I start narrowing it down towards, "where do you want to go?...medicine?"..Ah, I say medicine, biology not necessarily, what's going to be more important is your Physics and Chemistry for that so follow that path and then go from there.

FB: Thank you very much.

Interview transcription
Physics Teachers in the Philippines

Transcript of the interview with Physics Teacher 1 (PT1)

FB: Good morning Mr _____.

PT1: Good morning.

FB: Based on your answers in the questionnaire that you filled out earlier, it looks like you have a solid background in mathematics and science [particularly physics]. What interested you to study physics?

PT1: Actually, since I was young, I am curious with everything I see around me, especially all the technologies now so that made me become interested to study physics because I want also to know, uhm…the.. how…how these technologies were made and the concepts behind these technologies.

FB: That's good! So, how do you perceive physics in terms of its importance in the society?

PT1: Actually, as I have been mentioning, physics is very important in our society because without physics, I think all these discoveries or innovations will not be done without the principles of and concepts of physics so I think physics is very important.

FB: Thanks for that. So, what got you into teaching physics?

PT1: Actually, at first, physics was not my priority, but…but, when I saw all the technologies that were present at the time, especially the hi-tech technologies, that gave me second thoughts to study physics because, as I have said a while ago, I want also to learn how these discoveries or technologies were made.

FB: Thank you very much for that. Now, uhm…back during the days when you were in high school or perhaps in university level studies, is there any difference between the way physics is taught in present times and the way it was taught when you were still a student in physics?

PT1: Yes, actually there's a big difference. Before, we will just study theories….uhm, no…no…no materials were produced by our teachers before that's why…uhm, I think when I compare my learning before I think it was too short or…or minimal. So, the difference now is… now we have materials being used in our experiment compared before, we don't have materials…we just improvised materials before but I think that's not enough for us to learn physics. But now, though we are still lacking materials, uhm…we still have materials to use.

FB: Ok. Well, that answers my next question as to which is better in terms of student learning physics. Well, obviously, the way physics is taught now…uhm, it seems that it's better than before. Now, as a physics teacher, do you deliver your physics classes traditionally or with various styles?

PT1: Uhm, as of now, to be honest, I also deliver my classes traditionally [lecture method] because there are some topics wherein we lack materials so what I did is just to draw then explain the concept behind that drawing then…uhm, I just…I just explain it on how to do it on how to experiment it because we don't have actually materials to use. So that is traditional method. And there are times also that…uhm…by various styles, because so far we have some materials for the chosen topic so we make experiments.

FB: Ok. So..uhm…how do you know when your students are really understanding the concepts you are trying to teach them?

PT1: Uhm, when…when they apply it, especially uhm, in the experimentation. Uhm, if they apply the concepts through experimentation, I believe that they learned something.

FB: Do you think, in any way, that you imply to your students that physics is difficult, or easy?

PT1: Actually that is always the first impression of all students before we have our first lessons. I told them to write some, uhm…uhm….uhm…some views about physics, and all of them wrote that physics is very hard, but I told them that physics is very easy if and only if they will listen. Because, as I have said, physics is very important now; as you walk out, as you go around, or whatever you do there is always physics there.

FB: That's good! That's good! Now I think this will be my last question. You've mentioned earlier that you have difficulties with instruments and equipment and probably teaching materials in physics, can you please elaborate on that further please?

PT1: Uhm, as I have said a while ago, physics is enjoyable if and only if you have materials. Because I believe now that students will learn more if they will hold or have at least a glimpse on whatever materials that we will use on experiments. It's hard to imagine, especially in teaching physics, if you will only discuss how to do this, how to….what…what…what will be the process on operating this, I think that's just not enough. I think it is very important that they have the materials because they can see it, they can use it, and they can touch it.

FB: And, is the school doing anything to provide those materials?

PT1: Actually, I have been telling the school that my plan or my dream is to have a complete set of materials. So far, we lack budget. I cannot put blame on the school because we lack budget, but how I wish in a few years time, as I told our Director, we will have a complete and sufficient materials for teaching.

FB: Thank you very much, Sir. Thank you for your time.

Transcript of the interview with Physics Teacher 2 (PT2)

FB: Good afternoon, Ms _____. Thank you very much for giving me the opportunity to interview you this afternoon. Thank you very much for filling out the questionnaire, and I am sure this will be a very useful part of my study. Okay, so let's start. Uhm, my first question is what interested you to study physics?

PT2: Actually, it is not my choice to become a physics teacher. However, a certain scholarship drove me to be interested in it so….I am interested actually in mathematics so I said, this scholarship is…would be wasted if I will not accept it. Anyway, mathematics is….mathematics is really related to physics and I don't have really a specific course to take so I said why not give it a try?....

FB: Ok, so, that means since you are interested in mathematics then why not study physics as well, since mathematics is the language of physics.

PT2: Yes Sir. Then in the process I think I learned to somehow enjoy physics and then see the relationship of life and physics (smiles).

FB: That's interesting! Thank you very much. So, uhm…in connection to the first question, how do you perceive physics in terms of its importance in the society?

PT2: Oh…we cannot…we cannot…what I mean is that physics is really important. We cannot take it for granted. If you are not aware of where do these technologies come from, you may say it's nothing. But then, if you will dig into what are the components of these, why do these work, it will all boil down to physics. Physics is a very basic subject. We can say that physics is really an important subject or discipline.

FB: So, when did you realise that physics is part of everything around us?

PT2: When I was in high school, of course the teacher already implied it. But, of course, as a student somehow then, "Yes, it is", and then when I go to College for teaching and knowing the basics and how to tell them this and that, I mean, the interest there really deepened.

FB: So physics practically grew on you. Now you are teaching physics, what got you into teaching the subject? Is it out of necessity? Is it out of interest, or both?

PT2: I think it's both. Out of necessity because of the scholarship and…and… that the motivation is there that I was able to learn this…these things about physics, and I want to impart it to my students…and I hope I am (laughs) in the nice way I can (laughs).

FB: I am sure you are no doubt about it. Okay, of course, you were once a student in physics and now you are teaching physics. Now, my next question is this: is there any difference between how physics is taught now [in present times] and the way it was taught when you were still in high school or university?

PT2: Ah…When I was in high school…I cannot…I cannot give you the details but I can just remember then since I was interested in mathematics I can only remember the mathematical part and that's why I was enjoying physics then. But when I went to college,

actually, uhmm…our physics subjects when we were in college were also mathematical. I only came across some practical explanations of it connecting to real life situations when we attended seminars. So it really helped me a lot and then the difference is that….when I was in high school, there were a lot of mathematics in our physics. I cannot remember anymore if there were some applications….Maybe there were some that I really enjoyed…

FB: You don't remember any of the conceptual part of your high school physics?

PT2: The conceptual part was there but I can only remember the mathematical part of it. So what I was trying right now is to get them [the students] to get to know the concepts. But as I have told them, we cannot really remove the mathematics of it. And I can see that there is a similarity in the hardships in the mathematical part, but somehow I hope I am able to reconcile the difficulty of the mathematical part and the beauty of the conceptual part of it.

FB: You have mentioned a while ago that you deliver your classes traditionally. Have you ever tried a different style? Let's say a more interactive style of delivery?

PT2: Usually, Sir…I started…I…I throw questions to them. Uhm…I…It's hard for me to give, I mean, state all statements and that usually I am giving them situations and then, for example, in Law of Inertia for example, uh, I am going to give them situations and then from those situations I will ask them to observe, and then from that observation, I'll ask them to say what is the Law…what's the meaning of the Law…

FB: So, more on clarification type of teaching. What about the use of multi-media, have you ever tried it?

PT2: Uh, yes. Once, especially with graphs with pictures...uh, analysis of graphs, so it helped me with, with teaching them how…how to analyse graphs of a certain…motion of a certain object.

FB: How do you know when students understand what you are trying to teach them?

PT2: They are responding…positively (laughs). When you ask questions they are responding…and, uh, you can see from their faces that…when they are not interested anymore.

FB: Does this happen often?

PT2: We cannot say that for….I mean, there are…there are students who are not really interested and most of the time I can see those faces….not interested faces.

FB: Hmm, interesting! You mentioned about students not interested in the subject, so are there any measures that you do in order to get them interested in the subject?

PT2: Uh, I noticed that whenever I bring with me some materials, say a ball, they are interested about what I am going to do with this ball, will I show it to them?...then they get interested with what we are discussing…but…but…I think I can only sustain their interest to some extent…and of course, I will not have that ball forever to show to them, and there will come a time when we will get to the mathematics part of it…and that's

when they start to get silent and then…but I hope somehow I got them interested during the first part of the lesson.

FB: I guess this question will get you reflect further on your way of teaching…Do you, in any way, imply that physics is difficult?

PT2: I think there are cases…uh…when we go to the mathematics part of physics…uh…I think…uh…I am showing it to them, I mean, do this one first, and this one first, and then they will realise, we were able to cover the whole board, and…and…they will say "*Ooo, mahaba*" [Uh-oh, it's long!]…But I keep telling them, don't take it as a whole…I mean…everything at the same time, so you think of the parts…so parts of it are simple, so if you will be able to connect these simple parts, they will be able to understand that seemingly complex solution.

FB: Thank you very much for your insights. Thank you very much for your time.

Transcript of the interview with Physics Teacher 3 (PT3)

FB: Good afternoon, Ms _____. Thank you very much for giving me this opportunity to interview you about your experiences in teaching physics, and perhaps, share with me some of your insights about physics education here in the Philippines. So let's start with this question: what interested you to study physics?

PT3: Actually, physics is a very interesting subject for me because every topic in physics can be related to everyday living. Actually, my really students enjoy it, as I enjoy it too.

FB: That's good! Not a lot of people seem to enjoy physics nowadays, unfortunately. How do you perceive physics in terms of its importance in the society?

PT3: Physics is really important in the society because every topic that we study in physics is all about different things happening in the society….example is in technology; without these different machines, hi-tech gadgets, and different things that we see and use everyday….we wouldn't enjoy all of these without physics.

FB: What got you into teaching physics?

PT3: At first, I did not teach physics because I was teaching chemistry, but then, when I found out that teaching physics can be really interesting especially with the daily activities,…that's when I started to like teaching physics.

FB: You've mentioned that your area of specialisation is chemistry, and, of course, you know that physics and chemistry are two very related sciences, how much training in physics did you get when you were doing your course in chemistry?

PT3: Actually, formal training, I don't have any. I just had assistance from my coordinator.

FB: Now let's talk about when you were still in high school [or college] doing your physics subjects. Are there any differences in the way physics is taught in present times and the way it was taught when you were still a high school or a college student?

PT3: Actually there's a lot of differences. When I still in college, my teacher…the way my teacher taught us…uh…was like just write some stuff on the board, gave us some problems to solve, and then derive formulas…and…that's it! While now, now that I am teaching physics, I do different ways in teaching it. First, we do activities, and then relate it to our everyday living, then after that I help them realise the different concepts, and integrate it to different phases or situations in their life….for them to be familiar with different concepts, formulas….and, that's it!

FB: Basically, you are implying that teacher is a major factor in motivating students to study physics....There might be an obvious answer to this question, but…do you think physics was taught better then, or the way it is taught nowadays?

PT3: Of course, the way it is taught now. Yes…I know teachers nowadays who are so flexible; they can learn everything, they can integrate different techniques of teaching…while in the past, of course, well…I don't know, but, correct me if I'm wrong, but my teachers then were so "traditional". One factor that affects the teaching, of course I said a while ago, the teacher because my teacher then was an Engineer.

FB: Now, talking about some teaching strategies,…of course, you have mentioned some teaching strategies before, I would like you to elaborate further, uhm…what exactly do you do when you teach physics, like within a week period. For example, if you are going to teach a topic in "motion", how would you do that?

PT3: First,..uh…I give them illustration about the topic…about the different topics or sub-topics. Then after that, I explain to them the different concepts…uh…and while learning the different concepts, we apply this to normal life situations, and then, I simply integrate the different formulas to solve different cases about their life involving physics.

FB: What do you think is the reason why more and more students seem to move away from studying physics? What do you think are the reasons behind this?

PT3: Uhm…I think it is their mind setting. They have that mind setting that mathematics and physics are difficult subjects because they involve numbers, and different problems which are so difficult to do…to manage…to cope with. Some of my students….uhm…are not that…uh…so…they are not so…uh…curious about the topic….I think they have that mind setting....But some of my students are eager to learn.

FB: That's good! But do you imply in any way that physics is difficult?

PT3: Uhm, I am always telling them that, uh, physics is a very interesting subject, and it is true, *di ba?* (isn't it?). And as you go further studying physics, you will appreciate different concepts [involving physics] about your life.

FB: And, uh, whenever you teach physics, how do you know when your students actually understand the topic that you are trying to teach them?

PT3: Well, one way of evaluating my students is when they can solve problems, and they can explain well what is really happening in a certain situation involving physics that is given to them.

FB: What can you say about their body language inside the classroom?

PT3: Body languae?...Uh, most of the…the facial expressions I experience with my students…those who got the correct answers to my questions looked happy…while the others…uh…(laughs)…

FB: Overall, what do you think are the things that need to be done to improve our Physics Education here in the Philippines?

PT3: Well, of course, the first thing is to have good infrastructures….then good teaching materials, and uh…teaching different students so that they can become familiar with the, uh, different concepts in physics as well as the different types. Well, uh, innovation regarding books, knowledge…nowadays we have, uh, different technologies that we could use to aid our teaching.

FB: Do you think technology can improve the learning process of students?

PT3: Technology has something to do with uh,…well…with upgrading the level of understanding of students regarding physics. And it can help them understand better different concepts. For example, they say students learn better visually using computer simulations. If we have these, then we can provide students opportunities to get a better understanding of concepts in physics.

FB: Thank you very much for your time.

Transcript of the interview with Physics Teacher 4 (PT4)

FB: Good afternoon Ms. _____. Thank you very much for giving me the opportunity to interview you today about your experiences in physics and your insights about the physics education here in the Philippines. Now let's start with this question: uhm, what interested you to study physics?

PT4: Actually, at first, I was obliged to study physics because in college, to be able to major in a certain field, we needed to take a certain and a certain interview. And then, before, I really wanted to major in mathematics, but my coordinator told me that…the coordinator in science got me first before the coordinator in mathematics…uh, that is from my area…so, I was obliged to study physical science during that time. But as time went by when I was still studying in college, I was getting more interested in physics, because most of the time problems in physics are being applied in our everyday life, so that's why until now I still enjoy studying physics.

FB: So, basically, you are saying that physics grew on you. That's good! Now, uhm…you are saying that physics is applied in everyday life, uhm…it's true that physics

is all around us. Now, how do you perceive physics in terms of its importance in the society today?

PT4: I think it is important because, uh..like electricity and other things that…or like machines that we see and use everyday…in our everyday life, there is an involvement of laws of physics. So, laws like the ones used for, like power plants to manufacture electricity. I think physics is very important in our society.

FB: So would you agree then that in any area of study..in any course that you do there's always physics behind it? Like nursing, for instance, would there be physics in the practice of nursing?

PT4: Yes! …Uhm, during that time when I was still in college I was staying in a dormitory so, in a dormitory, we are staying with students doing different courses or degrees. Most of my dorm mates were taking up nursing. So, even though in simple aspects, there is still physics like inclining the bed of their patient or inclining the legs of their patient if there's a fracture or any injury that would call for proper inclination.

FB: Now, you are a teacher of physics in this school, what got you into teaching physics?

PT4: Actually, at first, I was still obliged to teach physics because there were no available teachers to teach that particular subject…plus, uh, the availability of my time fits that particular time for that particular class. So, last year, my first year of teaching in this institution, I was obliged to focus on physics…but until this year, since I think they are already satisfied with my teaching performance, they are still giving me that particular subject to teach.

FB: Do you like it?

PT4: Yes!

FB: Now, when you were a student in high school or in university, of course you had your share of learning physics…and now you are teaching physics, is there any difference in the way physics was taught back then and the way it is taught nowadays?

PT4: As far as I can remember during my high school days, my teacher only focused on problem solving and, actually, uh, she's more of a traditional type of teacher. But nowadays, since there is a push from DepEd on student-centred teaching, and uh, learning, we normally encourage them or teach them by doing a certain activity which is uhm, an application of a certain concept, so that why there is a big difference during my time and this time that I am already a teacher in physics.

FB: So do you think that the way physics is taught now is better than before…is any significant difference?

PT4: I think yes, there is a big difference because, for a student, it is much easier to, uh, understand a certain thing is they see it in actual…or use it in a practical application instead of just forming a certain image in their minds or encourage them to form a certain thing through their imagination.

FB: As a physics teacher, how do you deliver your classes?

PT4: It depends on the topic. For example, for a topic about heat capacity, I consider myself as a traditional teacher, but when it comes to thermodynamics….uhm, when it come to electricity or projectiles or free-falling bodies, I think I am more of a teacher who concentrated on activities because it is more easy to deliver a lesson that can be "seen" by the students, because it will be much easier for them to understand it.

FB: Have you thought of changing the way you teach certain topics when you think you are becoming more of a traditional teacher?

PT4: I think, yes, but for me, I think…I have to undergo some training first before I can do that particular way of teaching a particular topic where I tend to become a traditional teacher.

FB: There are lots of articles that show a decreasing trend in the take-up of students of physics. What do you think is the reason for this?

PT4: I think, uh…the common connotation about physics is that it's hard….aside from the application of the concepts of sciences; also an application of these concepts in mathematics. Most commonly here in the Philippines, when [students] hear math, it's difficult, it's hard, boring…it's for intelligent people…and then you have to input some science concepts aside from mathematics. Common thing that they say about physics is that it's hard.

FB: Do you imply to your students that physics is difficult?

PT4: No…

FB: So what do you do in order to motivate them?

PT4: I always tell them that physics is not difficult if they focus….And at first, I give them simple problems, and then up to a certain hierarchy that the problem is already difficult. *Parang* (It's like), I am trying to develop the basic concepts first,…conceptual development, and then mathematical…until we reach solving more difficult problems.

FB: Do you any difference in the reaction of students to when you are teaching them the concepts without any mathematics, and when you are teaching them the mathematical skills that they need?

PT4: Yes, students find it difficult because they have to inter-relate the conceptual and the mathematical part.

FB: Do you think your students are just enjoying the conceptual part of it and not the mathematical part?

PT4: It depends on the…our topic of the day. This is because every person has a different level of intelligence. There are some students who enjoy mathematics and there are some who don't. But it actually depends on the approach of the teacher on how to deliver a particular topic. So, the role of the teacher has a big part on how students enjoy a subject.

FB: Here in your school, what can you say about the distribution of male and female students in one physics class?

PT4: For this year, it's roughly even.

FB: Now, I don't know how you're going to react to this, but do you have any preference as to who to call in class? Do you call more females more often than males?
PT4: No….I am equal to everyone.

FB: How do you know when your students are actually understanding or learning the topic that you're trying to teach them?

PT4: Sometimes, students share their ideas about a particular topic, or…..some of the students don't have a skill in expressing their opinion or feelings, I can foresee or see their understanding of a particular lesson through writing.

FB: What...what can you say about their body language when they understand the lesson… or not understand it?

PT4: Not at the moment…I haven't noticed it yet!

FB: What do you think are the things that need to be done in order to improve our Physics Education here in the Philippines?

PT4: I think…the…the role of the teacher. Uh, because the teacher is the one who is standing between a specific lesson/topic and the students. The teacher serves as the bridge so that physics can reach the students and that students can reach physics.

FB: Do you think the curriculum is enough?

PT4: I don't think so.

FB: Should there be more?...or less?

PT4: I the curriculum should be enhanced. I think the content is already enough, but the approach of delivering a certain topic for physics needs a lot of help…especially for a new teacher like me.

FB: Thank you very much for your time.

Transcript of the interview with Physics Teacher 5 (PT5)

FB: Good morning Mr. _____. Thank you for giving me this opportunity to interview you today about physics education and your physics experiences. I have five or six simple questions that can answer…and you can answer them as briefly as possible. So, what interested you to study physics?

PT5: When I was still in high school I enjoyed science…science in general, physics in particular….even in primary school it was always science that I had interest in…uh, in high school I always remember I had a good feeling every time we did an experiment and was able to understand a concept. I always felt that the concept that I have learnt, I could've come up with them myself if I had the opportunity to experiment or just make an observation. So, in a sense, I wouldn't say that the teacher was unnecessary but the guidance that the teacher provided was there, because that's what…what allowed me to understand these things.

FB: And, perhaps the expertise as well.

PT5: Yeah. It wasn't that...not…the knowledge itself was not really from the teacher but,…uh…getting me to access that knowledge…that's what I got from my teacher.

FB: So, it was more of a guided discovery.

PT5: Yeah. So that's what I like because it…it allowed me to….from that I realised that I was not dependent on the teacher; I didn't have to get all my answers from the teacher, but I learned was, uh, the teacher was there to help me to find out… to get this knowledge. So, that's what I…when I felt that…boy, it's a good feeling to have…If everybody else could get this really it would be a great discovery of knowledge.

FB: How do you perceive physics in terms of its importance in the society?

PT5: Many times I feel like, uh, especially with students, I see that students think that physics, studying physics is not so important. We can't see how going to too much detail about how a ball rolls, and so on…how can that be applied to their everyday life?...Well, the way I see it, yes, yeah even when I was a student starting to learn physics, studying details about physics, yeah it's hard to see any relevance to study physics. But then I came to realise it's a very near-sighted view, then, especially when we try to think more about it…like technology; where does it come from…then, what we need to study to get to that point. And then, I was only able to realise that through my own experiences with them, realising that I can't just say…okay…for now, okay this is all I need…but then, where do we go if we don't…if we don't move on with…with what you're learning. So when I talk to my students, that's where…where I go when they ask me, "Sir, why do we need to study this?...What's the point? We're not going to use this!"…So I tell them, "Where…How do we progress if we don't develop…if we don't study these things…then, we stop if we don't do that then where we are now is where we'll be later on." So, and then…when I get students to realise that as well…and then understand, maybe on faith, that later on they'd realise that they do need it, then for that time that's enough.

FB: I totally agree with that. We are on the same stand….Is there any difference between the ways physics was taught before compared to the way it is taught in the present times? Any major differences?

PT5: Whoa!...It is very different that before because now we have these technology that we can use like animations, projectors and videos, versus the way it was taught let's say when I was in high school, in college, it was mostly board work…so that is good because we were forced…the discipline of the students is different then than it is now. Students now are a little harder to keep their attention for very long. We have to think of ways to get their attention, to give them a treat every now and then….versus students before, when I was studying, it was expected of you to put in more effort because teacher weren't there to entertain you, really; you were there to work for the teacher in a sense, so, in that sense the students then were more disciplined, they were easier to teach in that they put in the effort. Students now are at a harder position regarding that, but then, because it is also easier to give them all these information, and then once you get their interest, they can be the once that can go looking,…they can go looking out for the information themselves. When that happens, then it is good. So, the thing is, …is to get them interested enough to want more information, to learn more about it, then, …because the technology is more accessible to students, sometimes more than it is to the teachers. They are more familiar on how to go around computers, and so on…the internet. So, the main thing now is to get them interested, to let them realise the value of studying physics, and then give them access…give them the means, the know-how on where they can all these information. Basically, guidance.

FB: How do you deliver your physics classes?

PT5: Uh, I have been teaching here in the Philippines..for high school just this year. Previously, I was teaching Thai students. I was teaching physics in Thailand for four years. Prior to that I was teaching here but in university, so I don't really have that much time teaching high school…Filipino high school students here, but what I found is the approach isn't really that very different. What I have also noticed is students coming into their physics curriculum, the first time they study physics, they already have that idea that physics is a difficult subject even if they have studied it before. They already know it is difficult. "How do you know? You've never studied it?" So, what I have come to conclude from that is…from what students here…from other students…from older..those older people is that physics study can be difficult. And then, coming into the classroom, coming to their first study of physics, they already that idea that they are going to have a hard time, and..that…that hinders their progress in studies. So the first thing I try to do is make it accessible; make it relevant, make it relevant to what they can experience, so, my approach in the beginning of a certain topic is…real examples…real world systems, or real world situations where, okay, they have experienced it; they know how things work. It is connecting physics to what they already know, and then realise that...ha!...it is not so hard at all..it is not that difficult at all. So, when they…when they are able to cross that barrier, saying that physics is difficult, then it becomes easier for me. So may approach is let them realise that physics is not really that difficult in a sense that the subject matter is so foreign to them, but it requires a certain discipline, a certain approach, and then what they realise they just need to be familiar with it; to be comfortable with it…then they will feel it is not really that difficult.

FB: So you do not ever imply to your students that physics is difficult?

PT5: No. That is the least I want to impart on them because when that's the case, then students that are able to do it,…okay, they're…they're smarter, or they have better understanding of the math, and so on….then, sometimes it can get into their heads, then…for them it's okay, they are able to do more, but then for the population in general, when other students see that it's just the smart kinds that can do it, it is not good for the whole population.

FB: Research shows that the number of students opting to do physics is decreasing dramatically. Would you think this is because of the mathematical part of it, or would it be because of the general "reputation" of physics?

PT5: I would…of course, it's..it's…it definitely depends on so many other factors, but uh…I think it also depends on what students are more interested in now, and what they want to do later on. I think a lot of students are going to business, or whatever, maybe computers…okay, so not necessarily detached completely, but not mainstream. Uhm, I am not really familiar with the studies, but uh, I do feel that numbers are going down. I think it also has more to do with, if a students were to study physics, he/she would have to know what would come after studying physics. Is he going to stay at university forever…is he going to do research forever at university?...I think you need to, uh, let them realise what they can do afterwards, and then that can get them excited, then that…that words would spread and then more students would be interested. So, it's more of a question of what's in it for them, because being a student…being young, they are more concerned with what they can get from what they're going to do. It's business and it's money and they are easier to relate. So, mostly, I don't think it's really just the math or having to study a difficult subject but, more of what they can and do and what they can get from doing this. So, if they are aware of what physics can bring to them, I think it might be able to change the situation.

FB: Are you aware of the gender divide between males and females in physics?

PT5: The divide meaning more males than females?...Uh..even when I was still a student, mostly men…or boys would be interested in technical subjects, let's say computers, engineering, than the girls. I don't know why but it could be…it has something to do with how we're made up. Mathematically, boys are more interested in this stuff. I think physics is not all men, because, in some ways being creative can be…can be very, very efficient to physics studies, and in that sense I don't think there's really, uh, a divide..say who's better…guys more creative than girls in this regard…so, in that line of thinking, anyone can perform…anyone can create..or anyone can contribute to physics studies. So, that just tells us that, if you are going to do physics, and then do the mathematical approach in studying physics, then of course, okay, history tells us that most of the guys would be more attuned to doing that, but we don't study physics now just in terms of the math. There would be other applications where physics study is still…can be, can be approached in different ways.

FB: So it depends on the application of physics.

PT5: Yeah. Again it has..we have to make people aware that…uh…contributing to physics is not just in the math department. So, again, those who are in the physics community, if they can be more…uhm…I don't know…how, how they can present opportunities for physics, and then how people with different strengths can contribute, and then I think that would make it more interesting, because many, many of my

students here…boys and girls are definitely not equal…it's two-to-one, boys to girls, so it's a big difference; it's a big divide. But many of the girls perform very well. Many times it's not with the math, but with the concepts, because understanding what's happening…many of the boys..okay…once they understand what happening then it is really very easy for them because the math are not that difficult for them. So the girls can contribute, it's just that once they reach the math part, it slows them down, in a sense. The girls understand what's happening but they can't really relate…or, it can be a bit more difficult for them to connect the math to the concept, so they give up. If they realise that…Ah, that's enough…Sometimes, it's enough that you understand what's happening, and then you can contribute and be creative and put out your own ideas, then…they are contributing, and that's enough…So, once they realise that,…yeah, if I can get my students to realise that they can contribute, depending on what they can contribute and what their strengths are, then they can develop and contribute to physics.

FB: Thank you very much for your insights and thank you very much for your time.

Transcript of the interview with Physics Teacher 6 (PT6)

FB: Good morning Ms._____. Thank you for your time today to share with me some of your insights about physics and physics education here in the Philippines. So let's start!

FB: What interested you to study physics?

PT6: Uhm…first of all it was my father who, uh…motivated me to study physics because he was a physics teacher. Eventually I learned to like physics also, but initially I did not.

FB: Now, how do you perceive physics in terms of its importance in the society, especially nowadays?

PT6: Yeah, of course, I think physics is very important, especially today that, uh, or course, we are in the modern times and technology is, uh, getting more and more sophisticated so physics is uh…a good foundation in physics is uh, of course uh, is the key to that.

FB: You were a physics student once, and are there any differences between the way physics was taught back then and the way it is taught nowadays?

PT6: Yes, there is a big difference. Uh, during my time, uh…uh, we did not have laboratory apparatus and materials. My high school was not a science high school, unlike here we have all the materials so, uh, we, uh, the students are now more exposed to, uh, equipment and hands-on activities, so that makes physics more interesting.

FB: And do you think that's better than the hard-core traditional teaching back then?

PT6: Yeah, because, uh, students, uh get more involved.

FB: Okay. Thanks for that. Now, as a physics teacher, how do you deliver your physics classes?

PT6: Usually, I, uhm, start with demonstrations because that would attract their attention, then, uh, from there I would develop the concept so uh, in that way, they know the application first before they crunch the mathematical part.

FB: So concept-building before mathematical skills. Now, you use different modes of teaching like, uh, there will always be the traditional part of it where you stand in front, you have your chalk board behind you, and then teach the class with uh, whatever comes up or whatever mathematical skills they need. But do you also use something like multimedia or computers?

PT6: For now, uh, we…we don't…we have no computers in the classroom…We only have three here (laughs)…So, computer-based, none…But then, we have multimedia like OHP, or LCD projector.

FB: You've mentioned something about the importance of physics a while ago, but it seems that less and less students are realising that now. What do you think is the reason?

PT6: Uh…I think, uhm…it is both the mathematical component of it and the notion that physics is difficult. Mathematical notion, because when they enter physics what they have in mind is formulas, formulas, and formulas.

FB: In connection with that question, do you actually imply to your students that physics is difficult?

PT6: No.

FB: So what do you do to motivate them?

PT6: Uh…okay, when…when…I usually give them, uh, of course, when I introduce the formula I give them, as much as possible…I think of uh..problem solving….a sample problem where it would sound like uh…the formula could be very useful like, okay, for instance, we are doing electricity now, I start with lighting…so problems that they can relate, so…in that way they would be motivated to listen and learn the concept.

FB: And, perhaps my last question is…is a bit controversial it has something to do with this gender divide in physics. Uhm, of course, you have both your male and female students in your class. Now you are female teacher, do you…or are you conscious of, uh, trying to impart some sort of a gender balance in your classroom? …Like for example, not calling female students too often over male students…or vise versa.

PT6: Ah…uhm, surely, my male students are the best in physics. So, uh-huh…during recitations uh, my male students usually get active, especially in…uhm, doing the problems…That's what we do most in physics. Also in hands-on activities like, we are doing electricity, circuit diagrams; boys love that so girls usually are not that active, so I think I am a bit biased towards one gender.

FB: Thank you very much for sharing with me your insights about physics education here in the Philippines. Thank you for your time.

Transcript of the interview with Physics Teacher 7 (PT7)

FB: Good afternoon, Mr. _____. Thank you for giving me the opportunity to interview you about your experiences in physics and your insights about the Physics Education here in the Philippines. So, let's start with this question: what interested you to study Physics?

PT7: Okay, uhm…physics happened to be my favourite subject in high school..Philippine Science High School. Uhm, actually there are two subjects; physics and mathematics. When I was in UP Diliman, I was first a math major for two months before I shifted to physics. Then the primary reason was because of scholarship. There was a better scholarship offer to go to physics. And then, I realised, when I was going through undergraduate physics, I realised that there's something about physics that is more potent and more powerful than just doing mathematics. So you see physics in many aspects of life, and you use these principles of physics to explain these. So that basically what interested me,…Uhm, other than getting very good marks in physics (laughs)…so I persisted in taking physics in college. In college, uhm…I have my own share of, you know, observations about the type of instructions given by our professors, which is basically very traditional. Uhm, lectures are done in traditional manner. There were very rare moments where there was a classroom demonstration or a dissecting of how this or that work…so I got by…maybe I realised that's how physics is really taught in the university; there's a lecture component and there's a lab component…uhm, but in the lab component they give a follow-up procedure so…then I said, "Maybe there's something that has to be done about the way physics is taught in the university. My interest in physics went beyond studying physics because after graduating from college I taught physics in high school, specifically in a very good Chinese School here in the Philippines. The students are very good in mathematics, so I handled the "path" group…uh…that's what they wanted…they wanted calculations. Then I saw with my own very eyes that physics in high school in the Philippines is basically mostly geared towards calculations. And because that's how it was and I was a young teacher, I coped with the system…and that's how I taught and that's how I imparted the physics concepts to the students. I think that only changed when I got to the part of the UNESCO Active Learning Team. So, sad to say, I tried to be a very good traditional teacher (laughs) for my first 6 years in high school teaching. But when I went to college teaching I realised it is a totally different ballgame and even if I am teaching non-physics majors or physics majors I think I took it upon myself and as a responsibility for me to do physics teaching in Physics Education in the best way I can so I attended this conference on Active Learning which is in 1999 and year 2000 in Korea, so my mind broadened to this technique called Active Learning.

FB: You have mentioned something about the importance of physics a few minutes earlier; could you please elaborate on that further? How do you perceive physics in terms of its importance in the society?

PT7: First, I think physics is very important in the fields that people are interested in like telecommunications, uh, wave phenomena, all these circuits and stuff, uh, and then in terms of modern physics, of course, we can't really have so much of those modern physics stuffs in the Philippines, but then again through collaborative work we get to experience other tie-ups with other universities like…uhm, we have a tie-up with the International Center for Theoretical Physics, so it's my first time to see a particle accelerator, and so I am so ecstatic that here, something that I actually teach in the class, and then I actually see it happening. And then, other aspects like optics and photonics, you know like, uhm…it's there! And we have to let people know how physics permeates your lenses, your optical communications, your telecommunications, industrial aspects, machinery, even biophysics and genetic engineering there is physics. So…but then again, in…in my perspective, people see physics as an end in itself…just...it's physics for teaching! And, in fact, that's how students perceive it! If you take physics, you will become a teacher like Mr. _____ (laughs)…and I don't want to be a teacher forever like Mr. _____ (laughs)!...So, that's….that's how narrow students view it, and it's narrowed down some more if we teach it the way we been taught the traditional way because they have not even seen, what..diverging lenses and converging lenses even if they are wearing one, they don't know what kind of lens they wear so it's its practicability that is lacking in the teaching of physics.

FB: So, for the students, they only see the superficial value of physics.

PT7: Yeah!...Ask them how their cell phone works…they have that nice…they have the best cell phones in this…students here are very rich….I mean, so...their basic instinct is…they look…they look at you and ask you "Should I know that?"… In fact, we are developing people who use technology without having an inkling how the technology…or how physics is related.

FB: After you graduated, what got you into teaching physics?

PT7: I really wanted to teach. Uhm..I…I…at a young age, in high school, I knew I wanted to become a teacher because, you know, I like being in front and sharing with my students. Although, of course, my mind set has changed. Whereas before I viewed teaching as passing your knowledge to your students, right now my view has totally changed with this Active Learning technique. I think I am just a facilitator for the whole learning process, and a mediator…I am really not the source of all the knowledge. I believe in my heart through Active Learning that the students see that the real…the best teacher is the actual result of the experiment, not the teacher. We are just vessels.

FB: You are now a physics teacher. You've mentioned about active learning. You've mentioned about traditional teaching. How can you tell when a student is really learning the concepts that you are trying to teach them?

PT7: Okay. I think the next question is about assessment. In our department, Mr. Culaba, myself and another colleague from Washington State University formed a trio of people in the Physics Education research group. We try to develop assessment exams based on the Active Learning activities that we have. For example, We can ask for prediction from students certain demonstrations, and those predictions that they have which are based on their common sense notions, we actually use as part of an evaluation at the end of the semester, as part of their final exam, for example. And those items are cramped up as multiple choice items. If they really learned from the phenomena, or the technique that

we…we are using back, then they just have to recall and remember what actually transpired during the demonstration and then put the concept right beside it, and they follow the meaning and the concept. Unfortunately, it is not the same for the entire faculty in the Physics Department. Some are new in this university so they don't know this yet. Some are still there in the traditional mode, and in fact, they do make comments about, you know, "Why do you have to do that?...It is so time consuming. You won't finish all 21 chapters."..And it's true! Time is of the essence here because when we started to do Active Learning, my colleague who is now in the U.S., applied Active Learning for Introductory Physics for Physics majors, she finished only about 8 chapters of a possible 14 chapters. So, then, there's also something about time management. So, I believe Active Learning activity should be done sequentially; there must be a theme to your activities. You do it thematically, and then at the end of the day, assessment plays an important part.

FB: I don't know your take on this, but I am a strong advocate of "quality", rather than "quantity"…

PT7: But basically, I see the point of the other people also, because it is a series…say series 41, 42, 43…it is following a series, so the burden now lies on the professor for the next series, for the next level, because he/she has to finish the remaining chapters. So, what we said was, there should be a balance, I suppose, of pure "traditional" approach with this Active Learning. Maybe…maybe there's a good way to intersperse the two to find a maximal way to combine them.

FB: How do you not imply, not like some teachers, to your students that physics is difficult?

PT7: I let it be known by my attitude in class that I enjoy physics. Then, at the end of the day, it is a very simple thing if you understand the language because students get ticked off if you right away spew them with formulas and stuff. I don't! In fact, teaching wise, I don't start by defining frequency, field, etc. There's a demonstration, I ask them to measure how many drops per second was there…or, for example, how many circular patterns were formed, then at the end of the day, that's when I try to input the definition, but it is only after the activity. I think that's the thing that makes physics more appealing to people. You are teaching optics, you are teaching about lenses, I won't define a diverging lens or a converging lens; I'll begin with an activity and ask them to shine light on this device and see what happens to the light and then they will understand, "Ah, it is focussing the light..", and that of course is a converging lens. In that way, physics is fun!

FB: This is going to be my last question for you. Are you aware of the gender divide in physics?

PT7: Gender divide in physics…about only small fraction go into…Well, that's very, very true specifically for my physics class, the junior level. There are only two girls, into physics 1 sitting in, but she has vanished now, and all the rest are the guys. I also handled engineering classes…engineering physics classes, this is also true. It seems the girls think they have a pervading notion that physics and physics acumen and skills is meant more towards the guys. It is not their cup of tea.

FB: So, let's say, if there were only three girls in class how would you encourage them to participate?

PT7: Oh, I always tell them there are many opportunities in physics…especially for women in physics. In fact, I am encouraging my students to apply for a certain prestigious scholarship; one of my students is already a recipient of this scholarship, which is a scholarship for women in physics. And then again, they get interested. They say they are interested in optics and photonics; they want to study about, you know, image analysis, and shining a laser beam here, maybe detecting the number of pollutants in…in a certain body of water, etc. And...and it's true; I think the girls are really more interested to really go into hard core physics now… those two girls we were talking about in the junior level. The guys; they want to take physics because it's a cool subject…and they want as a second degree, but they also have a degree in computer engineering, which makes you think, "Are they really interested in physics, or are they interested more in computer engineering?" But I encourage more girls to go into fields of physics.

FB: Well, thank you very much for your time and I hope to see you again soon!

Transcript of the interview with Physics Teacher 8 (PT8)

FB: Good afternoon Dr. _____. Thank you for giving me the opportunity to interview you and, perhaps, share with me some of your experiences teaching physics and your insights about Physics Education here in the Philippines.

FB: My first question is, what interested you to study physics?

PT8: Actually, uhm, physics was one of my, uhm…uhm, favourite subjects in high school because it was quite easy for me to solve problems because of my affinity in mathematics.

FB: So, you are more mathematically inclined, and that motivated you to study physics.

PT8: Yes, because mathematics is being applied,…or is already a tool in physics.

FB: And, uh, how do you perceive physics in terms of its importance in our society?

PT8: Uhm…now?...or when I was in high school?...

FB: Perhaps, you can share both…

PT8: When I was in high school, I don't know yet the importance of physics. I just want to…I just like it because, uh, of my…it is quite easy for me to solve problems in physics, but I don't know really the significance of physics in my life. But now, I think that physics is, uh, is almost everywhere in almost all aspects of our life….physics is there. So, now that I am teaching physics, I always find a way by which I can, uhm…uhm, tell my students how the different concepts in physics can be applied in everyday life, like in a electricity. How can you make use of, let's say, Ohm's Law, Kirchhoff's Law, and when we are cooking using the electric kettle, uhm…doing uhm, whatever chore in the house. In troubleshooting everyday…even in electrolysis, when you electroplate your jewellery, we use physics.

FB: I am sure you can pinpoint a lot of differences between the way physics was taught back then and how it is taught in the present times. Which one would you prefer to use in your physics teaching?

PT8: Ah…the method back then is, uh, was, uh,..it's easy for the students to learn physics because we were taught to memorise formulas…Yes, rote learning. But now, since teachers, uh, show students how…how formulas were developed based on basic concepts based on the definitions of different terms, and also based on the demonstrations and experiments in physics. So it is easier for students now to understand the laws in physics.

FB: Since you have been teaching physics for so many years now, how would you classify yourself as a teacher?

PT8: I am not very traditional because, uh, now that I am teaching problem-based physics, uh, I can integrate physics with other subjects like, uh,…uh, right now we have…E.R….or the students are developing musical instruments…indigenous musical

instruments in preparation for their performance for the Filipino Week…or Filipino Day sometime next week. So, since I know that they need to assess…or to…get the characteristics of the musical instruments that they develop, then I ask them to do it in class…in my class the musical instruments that they will be using for next week's performance…I am more on the "applied" side of physics.

FB: It sounds like you are a big advocate of the Active Learning strategy of teaching. So do you think that teachers here should be encouraged to use the Active Learning strategy?

PT8: Yes, they should be encouraged to use Active Learning by integrating what they are teaching to other, uh…uh…fields of specialisation or areas.

FB: In the classroom when you teach, how do you know when students actually understand the concepts that you are trying to teach them?

PT8: Actually, there are so many ways like, uh…when you give, uh…seatwork in order for them to practice what they learned and when you are doing formal evaluations like in a test. And also in practical exams, we are able to assess the learning that they have in class.

FB: That's the more formal way of assessing their learning in class. But what can you say about their, let's say, their body language inside the classroom?

PT8: It is easy to see if they will…if they seem to be very happy with they are learning…or what we are doing, or demonstrating in class. I think they are learning something when…uh…and it shows when they get excited and it shows in their faces that they understand something.

FB: Probably you are aware that less and less number of students is getting into the fields of physics. Why do you think this is happening?

PT8: Maybe because, uhm…scientists here, uh…specifically physicists, don't get so much monetary reward. It is more on the financial reason. Because I think a scientist in the DOST, uh…uhm…is just getting like P25000 a month…just a little bit higher than the poverty line (laughs).

FB: Now, uhm…Ma'am, are you also aware of the gender divide in physics?...Like, a lot of "common people" are saying that physics is only for males.

PT8: I think…it is ordinarily true in the 60's, 70's, or maybe 80's…but now, I think there's….uhm, the number of men and…women taking up physics are more or less equal….uhm, in the Philippines it is like that, but I don't know in the other parts of the world. Actually, most of our students who enrolled in physics after graduating in high school, most of them were women…girls!

FB: When you are teaching physics in your class, do you imply to your students that physics is hard?...Or do you imply that physics is fun?...

PT8: I imply always that physics is fun. Like this morning we were uhm…uh….we were doing activities in magnetism, then I told them, "Okay class, we'll be playing now. We are going to play around magnets….so, this day will be a fun day for us because we will be

playing around magnets." And, when we did the activities…the day to day activities, I think they appreciated it doing that uh…uhm…getting the patterns of magnetic field around magnets.

FB: Here's my last question. For example we have class, and of course, there are males and females, what do you usually do when you see that the female students are sort of overshadowed by the activeness of the male students? Does that ever happen in your class?

PT8: It does not happen in my class. There's a sort of equality among girls and boys in our physics class. Uhm, the girls are even more aggressive than the boys when it comes to doing activities in physics. They are very good.

FB: Well, thank you very much for your time. I hope to talk to you again soon.

PT8: Thank you also for having us in your study.

Transcript of the interview with Physics Teacher 9 (PT9)

FB: Thank you Mr. _____ for giving me this opportunity to interview you today about your physics experiences and about your insights about some of the issues in Physics Education. So let's start with this question: what interested you to study physics?

PT9: So….when I was in college, uh…my, uh…teachers were, uh…influenced me to teach physics…because of their ability to, uh…to teach, especially….or particularly in, uh…physics…the way they, uh, taught physics,…mathematically and also in, uh, performing activities.

FB: So, basically, your teachers had a great influence on you studying physics. Now, how do you perceive physics in terms of its importance in the society?

PT9: So…basically, physics is everywhere…so from the time we get up in the morning there's physics…so…the basic understanding of physics is very, uh…important to me…for example, the, uh…or the physics application in real life situations.

FB: What got you into teaching physics?

PT9: So…I have been teaching for 17 years. So…for me, at first, teaching physics is just like "work" or a job to feed my family. But gradually, I got to love teaching physics because of its uh…or the uh…rewarding feeling when you see that your students are learning from you as a teacher.

FB: You were once a student in a physics class; are there any differences between the way you were taught physics back then and the way physics is being taught nowadays?

PT9: So…there's a big difference because nowadays…so, in order to learn physics, a teacher uses different strategies for him/her to become effective in the teaching/learning

process. So…nowadays we use some devices like, uh…using uh…computers, DVDs, and uh…particularly PowerPoint presentations.

FB: What you are saying now is that teaching physics nowadays is multimedia-rich, while back then it was just plain chalk board teaching. So which strategy do you think is better?

PT9: I think, the…way we teach today is more effective.

FB: So how do you deliver your physics classes? What are the teaching strategies that you employ in your classroom whenever you teach physics?

PT9: So…to become an effective teacher, first you have to involve your self in, uh…uh discussing certain topics in physics. So…uh you have to use good body language. That's important. Uh…The way you talk; the way you uh…you use some strategies, so you have to involve your self to become uh…realistic with some principles of physics. So…I also have to make sure that uh…uh…every topic; every inch of the lesson we uh…should uh…make it more interesting…and uh…enjoyable for every student.

FB: Now how do you know when your students really understand the lesson you are teaching them?

PT9: So if they learned the basic concepts of physics and uh…for example, uh…in activities they are performing…they are working in groups and you see some positive body language…they look happy. They respond positively…and that makes me satisfied.

FB: What do you think are the reasons why students are getting away from physics?

PT9: I think…uh, their lack of interest especially in mathematics. I think one of the reasons that they have is their lack of ability in solving physics problems and…uh…particularly if they have a weak foundation in algebra.

FB: So you are basically saying that students are moving away from physics because of mathematics and not physics. So how do you motivate your students to study physics?

PT9: I let my students know about the beauty of physics…uh, through real life applications….of…uh…the concepts. I show them some "magic" using physics.

FB: Do you, in any way, imply to your students that physics is difficult?

PT9: So….I always tell that them…that uh…uh, physics is not the kind of subject that they should be afraid of. So…if they realise the basic concepts in physics, they will enjoy…uh…So I make sure that they enjoy learning physics from me, and at the same time learn some science values.

FB: Well, thank you very much for your time.

Appendix I

Permission and Approval Documents

THE UNIVERSITY OF ADELAIDE AUSTRALIA

RESEARCH BRANCH
RESEARCH ETHICS AND COMPLIANCE UNIT

SABINE SCHREIBER
SECRETARY
HUMAN RESEARCH ETHICS COMMITTEE
THE UNIVERSITY OF ADELAIDE
SA 5005
AUSTRALIA
TELEPHONE +61 8 8303 6028
FACSIMILE +61 8 8303 7325
email: sabine.schreiber@adelaide.edu.au
CRICOS Provider Number 00123M

11 March 2008

Dr S Alagumalai
School of Education

Dear Dr Alagumalai

PROJECT NO: *Student's uptake of physics: a study of South Australian and Filipino students*
H-135-2006

Thank you for your report on the above project. I write to advise you that I have endorsed renewal of ethical approval for the study on behalf of the Human Research Ethics Committee.

The expiry date for this project is: 31 March 2009

Where possible, participants taking part in the study should be given a copy of the Information Sheet and the signed Consent Form to retain.

Please note that any changes to the project which might affect its continued ethical acceptability will invalidate the project's approval. In such cases an amended protocol must be submitted to the Committee for further approval. It is a condition of approval that you immediately report anything which might warrant review of ethical approval including (a) serious or unexpected adverse effects on participants (b) proposed changes in the protocol; and (c) unforeseen events that might affect continued ethical acceptability of the project. It is also a condition of approval that you inform the Committee, giving reasons, if the project is discontinued before the expected date of completion.

A reporting form is available from the Committee's website. This may be used to renew ethical approval or report on project status including completion.

Yours sincerely

Professor Garrett Cullity
Convenor
Human Research Ethics Committee

THE UNIVERSITY OF ADELAIDE AUSTRALIA

RESEARCH BRANCH
RESEARCH ETHICS AND COMPLIANCE UNIT

SABINE SCHREIBER
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CRICOS Provider Number 00123M

Applicant: Dr S Alagumalai

Department: School of Education

Project Title: *Student's uptake of physics: a study of South Australian and Filipino students*

THE UNIVERSITY OF ADELAIDE HUMAN RESEARCH ETHICS COMMITTEE

Project No: **H-135-2006** RM No: 0000007348

APPROVED for the period until: 31 March 2008

Thank you for the supplementary information and revised participant information and consent forms dated 21.2.07. It is noted that this study will be conducted by Francisco L Ben, PhD candidate.

Refer also to the accompanying letter setting out requirements applying to approval.

Professor Garrett Cullity Date: 1 MAR 2007
Convenor
Human Research Ethics Committee

Page 1 of 1

Government of South Australia
Department of Education and Children's Services

Policy, Performance & Planning
Education Centre
Level 8/31 Flinders Street
Adelaide 5000
South Australia
GPO Box 1152
Adelaide 5001
Tel: 8226 0119
Fax: 8226 8890

DECS CS/07/0108.7

20 April 2007

Dear Principal/Director/Site Manager

The research project *'Uptake of Physics: A study of South Australian and Philipino students'* being conducted by *Mr Francisco Ben* from Adelaide University has been reviewed centrally and granted approval for access to DECS sites. However, the researcher will still need your agreement to proceed with this research at your site.

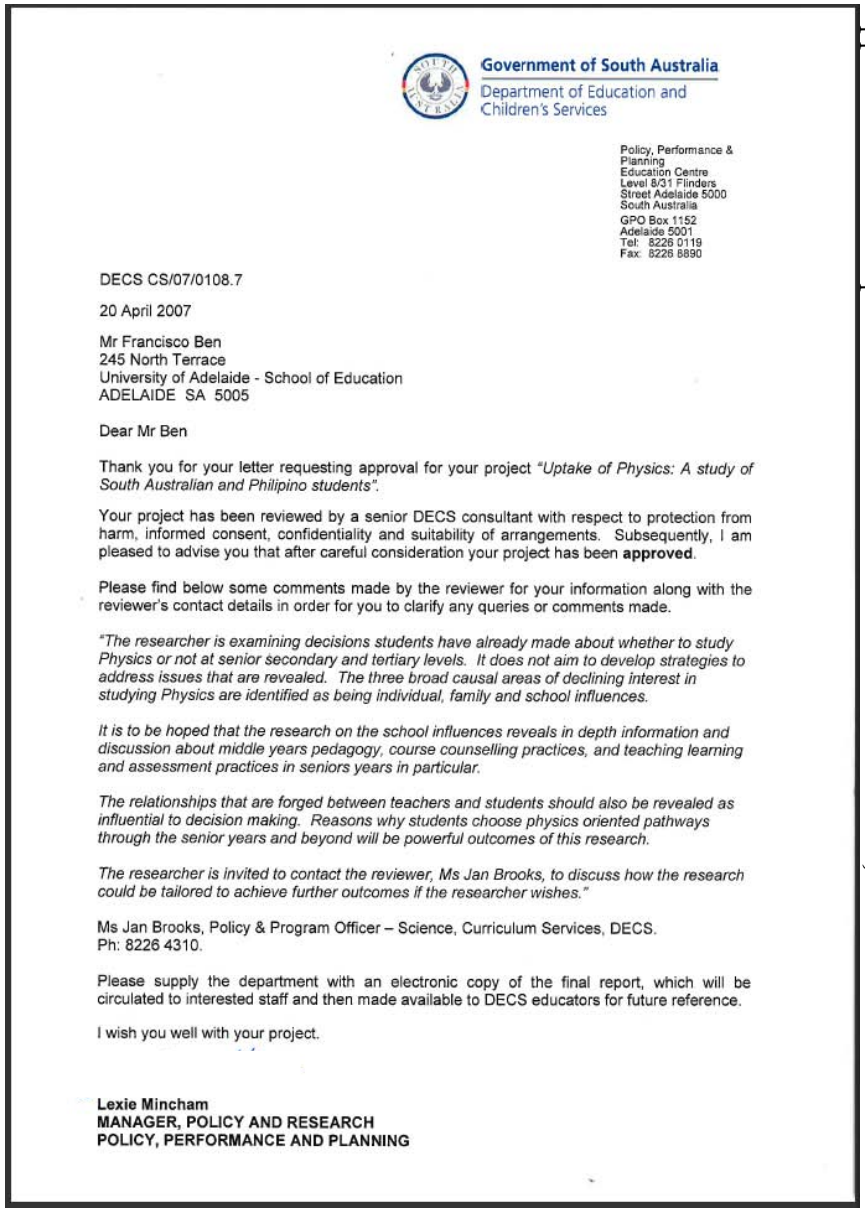
Once approval has been given at the local level, it is important to ensure that the researchers fulfil their responsibilities in obtaining informed consent as agreed, that individuals' confidentiality is preserved, and that safety precautions are in place.

Researchers are encouraged to provide feedback to sites used in their research, and you may want to make this one of the conditions for accessing your site. To ensure maximum benefits to DECS, researchers are also asked to supply the department with a copy of their final report, which will be circulated to interested staff and then made available to DECS educators for future reference.

Please contact me on (08) 8226 0943 for further clarification if required, or to obtain a copy of the final report.

Yours sincerely

Lexie Mincham
MANAGER, POLICY AND RESEARCH
POLICY, PERFORMANCE AND PLANNING



Government of South Australia
Department of Education and Children's Services

Policy, Performance & Planning
Education Centre
Level 8/31 Flinders Street Adelaide 5000
South Australia
GPO Box 1152
Adelaide 5001
Tel: 8226 0119
Fax: 8226 8890

DECS CS/07/0108.7

20 April 2007

Mr Francisco Ben
245 North Terrace
University of Adelaide - School of Education
ADELAIDE SA 5005

Dear Mr Ben

Thank you for your letter requesting approval for your project *"Uptake of Physics: A study of South Australian and Philipino students"*.

Your project has been reviewed by a senior DECS consultant with respect to protection from harm, informed consent, confidentiality and suitability of arrangements. Subsequently, I am pleased to advise you that after careful consideration your project has been **approved**.

Please find below some comments made by the reviewer for your information along with the reviewer's contact details in order for you to clarify any queries or comments made.

"The researcher is examining decisions students have already made about whether to study Physics or not at senior secondary and tertiary levels. It does not aim to develop strategies to address issues that are revealed. The three broad causal areas of declining interest in studying Physics are identified as being individual, family and school influences.

It is to be hoped that the research on the school influences reveals in depth information and discussion about middle years pedagogy, course counselling practices, and teaching learning and assessment practices in seniors years in particular.

The relationships that are forged between teachers and students should also be revealed as influential to decision making. Reasons why students choose physics oriented pathways through the senior years and beyond will be powerful outcomes of this research.

The researcher is invited to contact the reviewer, Ms Jan Brooks, to discuss how the research could be tailored to achieve further outcomes if the researcher wishes."

Ms Jan Brooks, Policy & Program Officer – Science, Curriculum Services, DECS.
Ph: 8226 4310.

Please supply the department with an electronic copy of the final report, which will be circulated to interested staff and then made available to DECS educators for future reference.

I wish you well with your project.

Lexie Mincham
MANAGER, POLICY AND RESEARCH
POLICY, PERFORMANCE AND PLANNING

Letter of Advice from the Catholic Education Office (CEO), South Australia

Catholic Education Centre
116 George Street Thebarton SA 5031
PO Box 179 Torrensville Plaza South Australia 5031
Telephone: (08) 8301 6600
Facsimile: (08) 8301 6611
ISD: 61 8 8301 6600
Email: director@ceo.adl.catholic.edu.au
www.cesa.catholic.edu.au

Catholic Education
SOUTH AUSTRALIA

Mr Francisco L Ben
PhD Candidate, School of Education
The University of Adelaide
245 North Terrace
ADELAIDE SA 5005

Dear Mr Ben

Thank you for your letter of 22 May 2007 in which you seek permission to undertake research leading to the production of a thesis on the subject – Student's Uptake of Physics: A Study of South Australian and Filipino Students.

You request to conduct data gathering using a survey questionnaire at some of the Catholic Senior Secondary Schools in the metropolitan area. With the samples coming from randomly selected year 12 Physics students and teachers. You note that once permission is received you will write to the individual schools seeking permission to go ahead with the research.

It is noted that you have received approval from the University of Adelaide Human Ethics Committee.

In the normal course, permission of the Principal of each school in which you wish to conduct research is required. Research in Catholic schools is granted on the basis that individual students, schools and the Catholic sector itself is not specifically identified in published research data and conclusions.

Approval is also contingent upon the following conditions, i.e. that:

- a copy of the questionnaire has been provided to the Principal
- the permission of students and parents has been obtained
- the research complies with the ethics proposal of the University (*organisation*)
- the research complies with any provisions under the Privacy Act that may require adherence by you as researcher in gathering and reporting data
- no comparison between schooling sectors is made
- sector requirements relating to child protection and police checks are met by researchers:
  - where researchers obtain information in relation to a student which suggests or indicates abuse, this information must be immediately conveyed to the Director of Catholic Education SA

All staff, other workplace participants and volunteers within Catholic Education SA are required to undergo a police check through the Catholic Diocesan Police Check Unit. Use of an existing National Police Certificate (NPC) is accepted, providing it is less than 3 months old. Please find attached the Police Check Clearance Process.

As you indicate you will be in contact with students you will need to undertake a National Police Clearance. A copy of the application form is attached, which has been signed to allow for the waiver of the fee.

Please accept my very best wishes for the research process. I look forward to hearing of the outcomes in due course.

Yours sincerely

.....
ASSISTANT DIRECTOR
CATHOLIC EDUCATION SA

5 JUNE 2007

Letter of Advice from the Association of Independent Schools of South Australia (AISSA)

A I S S A

ASSOCIATION of INDEPENDENT SCHOOLS of SA

28 May 2007

Mr Francisco L. Ben
School of Education
University of Adelaide
245 North Terrace
ADELAIDE SA 5000

Dear Mr Ben

Thank you for providing details about your Research Proposal. The Association of Independent Schools of South Australia does not approve or endorse any research projects undertaken by external agencies involving member schools.

The participation of member schools in such research projects is a matter for the management of each school. Please be aware that currently member schools are required to comply with many Commonwealth projects involving collection of data as a condition of the receipt of public funds. This may influence the decision of the school Principal about the involvement of their school in your project.

I wish you well in undertaking the project.

Yours sincerely

Garry Le Duff
Executive Director

301 Unley Road Malvern South Australia 5061 T 08 8179 1400 F 08 8373 1116 E office@ais.sa.edu.au
Formerly South Australian Independent Schools Board Incorporated

Police Clearance Application Outcome

Email from the Directors: Commission on Higher Education, National Institute of Physics and Ateneo de Manila University

Web Mail :: INBOX: Thesis

Date: Wed, 14 Mar 2007 08:07:10 +0800 (PHT)
From: "Jean C. Tayag" <jctayag@ched.gov.ph>
To: francisco.ben@adelaide.edu.au
Subject: Thesis

March 9, 2007

Dear Francis;

Your thesis is timely and focuses on a current concern of the education sector. It could generate information that would help us promote the sciences and persuade students to go into these fields.

You are welcome to conduct the study. You may directly contact the colleges and universities in your sample and write the concerned school officials.

You can find some relevant information at the CHED Website. Feel free to write in case you need additional information on the Quezon City higher education institutions.

Sincerely,

JCTayag

Web Mail :: INBOX: Permission to do a survey at NIP

Date: Thu, 17 May 2007 02:59:56 -0400 (EDT)
From: "Dr. Arnel A. Salvador" <arnels@nip.upd.edu.ph>
To: francisco.ben@adelaide.edu.au
Subject: Permission to do a survey at NIP

Dear Mr. Francisco,
I am inclined to allow you to do your proposed survey at NIP. However you will have to do a lot of coordination with our office and the commitee that handles the instructions. The projected time of 45 minutes for the students to answer your questionaire might mean that we may have to set aside one teaching session for this activity. Thus the teacher handling the class has to be prepared to have a make up for this. anyway if its planned right I think it will be doable.
Please acknowledge email
regards
Arnel Salvador
NIP Director

--

> I will be visiting your university sometime early August of this year.
> I will
> keep you posted as to when the exact date will be.
>
> Thank you very much for your assistance.
>
> With kind regards,
>
> Francis
>
>
> Quoting "Dr. Fabian M. Dayrit" <fdayrit@ateneo.edu>:
>
> > Dear Francisco,
> >
> > I just received your fax regarding your request to interview Physics
> > lecturers and students. In principle, I have no objections to your
> survey
> > as you have described it. I am copying this email to the chair of the
> > Physics Department, Dr. Jerrold Garcia, and I will pass your fax
> letter
> > on to him. In the end, the faculty members and the students
> themselves
> > should agree to participate in the study. I suggest the following:
> >
> > 1. Please a more detailed explanation regarding the objectives of
> your
> > study and the nature of the questions.
> >
> > 2. What level of Physics are you interested in? (physics for
> non-science
> > majors, 1st year physics majors, etc)
> >
> > 3. I suggest that you conduct your interviews during the tail end of
> the
> > laboratory classes, rather than at the beginning of the lecture
> classes.
> > This will be less disruptive. (45 minutes of total interview time is
> > almost one whole lecture class meeting.)
> >
> > If you need other assistance, please do not hesitate to contact me.
> All
> > the best with your study.
> >
> > Dr. Dayrit
> >
> > --
> > Dr. Fabian M. Dayrit
> > Dean, School of Science & Engineering
> > Professor, Department of Chemistry
> > Ateneo de Manila University
> > Loyola Heights
> > 1108 Quezon City, Philippines
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> >
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> > Tel: (632) 426-6001 ext 5600
> > Fax: (632) 426-5985
> > Email: fdayrit@ateneo.edu
> >
>
>

Date: Sat, 19 May 2007 05:53:39 +0800
From: "Dr. Fabian M. Dayrit" <fdayrit@ateneo.edu>
To: Francisco Ben <francisco.ben@adelaide.edu.au>
Subject: Re: Physics study questionnaire

Dear Francis,

You may want to consider linking up also with the student science organizations. The reason I am suggesting this is that if you can get the students themselves interested in your study, they will be more open to it and maybe even provide some interesting insights that you might not get if you have to give it in class under some time pressure.

At the same time, you can make a separate presentation to the faculty (Physics in this case). There are a few who are interested in Physics education.

In both cases, the interaction will be more interesting both for you and the subjects. They will, most likely, be very interested in learing about your analysis and conclusions as a feedback and input to their own improvement.

Toby

Quoting Francisco Ben <francisco.ben@adelaide.edu.au>:

> Dear Dr. Dayrit,
>
> Thank you very much for your prompt reply. Also, I appreciate your
> suggestions.
> Here are additional details of the study.
>
> I am trying to examine the factors that influence students to decide to
> study
> physics. These factors could be the student, family and peers,
> school/curriculum, teachers, exposure to computer games/technology. I
> will try
> to develop a path model for these factors. So far, no study has been
> done on
> Physics Education that considers all these factors in a single study.
>
> The questionnaire I am going to use contains quite a chunk of items
> (about 183
> in all) collected from existing relevant survey instruments that is why
> I plan
> to conduct the questionnaire survey in 3 sessions of about 15 minutes
> each. If
> this is not possible with your classes, I will let the students
> complete the
> questionnaire during their leisure time and hand it back to me through
> their
> lecturer after say, a day or two. The lecturers can do the same
> (although the
> questionnaire for lecturers may be completed in less than 10 minutes).
> Face-to-face interviews with lecturers will only be carried out if
> found
> necessary (after my pilot study here in Adelaide).
>
> Regarding student participants, I would prefer to have first year
> university
> physics majors as my sample. However, the exact numbers are yet to be
> determined. It might also be worth to survey non-science majors who
> are doing
> physics subject(s) but I don't see any necessity at this point.
>

> Allow for some lead time in terms of the letter being sent to parents, and
> the kids remembering to bring them back. They are very forgetful, most of
> the time.
>
> we have around 230 4th year students. And we have 8 physics teachers (but
> only 2 or 3 of them are handling 4th year physics). All the 8 teachers
> agreed to be part of your study, if needed.
>
> May I please see a copy of your questionnaire?
>
>
> Jessamyn
>
>
>
> On 7/19/07, Francisco Ben <francisco.ben@adelaide.edu.au > wrote:
> >
> > Dear Dr. Yazon,
> >
> > Thanks for your reply. Unfortunately, I still do not have the exact dates
> > as to
> > when I will be visiting the Philippines for my data collection. I am
> > still
> > waiting for the funding to arrive. Theoretically, I should be going to
> > the
> > Philippines not later than 15 August and come back to Adelaide not later
> > than 15
> > September. This means that my data collection will be happening sometime
> > between 20 August to 10 September. I will be the one to will bring the
> > photocopied letters to your school.
> >
> > Regarding the letter for the teachers, can I just use the letter addressed
> > to
> > the director as it contains all the information needed by the teachers to
> > know
> > more about the nature of the study?
> >
> > Please see the attached documents for your perusal. The letter to parents
> > should be enough to accompany the letter of consent request I sent you a
> > while
> > back.
> >
> > I hope this will help in the processing of my request.
> >
> > With kind regards,
> >
> > Francis
> >
> > Quoting Jessamyn Yazon < joyazon.pshs@gmail.com>:
> >
> > > May i have the dates you requested again please? Have you sent us the
> > > letter addressed to the parents and students – our students are minors
> > and
> > > so we need to ask permission from the parents to all ow their child to
> > > participate? Who will bring the photocopied letters to PSHS? I suggest
> > you
> > > prepare as twice as many copies as you need student participants.
> > >
> > > May i also have copies of the letter for the teachers so that they know
> > the
> > > nature of the study and what you are asking them to do - how long you
> > need,
> > > when , etc.
> > >

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Dr. Fabian M. Dayrit
Dean, School of Science & Engineering
Professor, Department of Chemistry
Ateneo de Manila University
Loyola Heights
1108 Quezon City, Philippines

Mailing address:
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0917 Manila, Philippines

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Fax: (632) 426-5985
Email: fdayrit@ateneo.edu

> > > thanks
> > > Jessamyn
> > >
> > >
> > > On 7/17/07, Francisco Ben < francisco.ben@adelaide.edu.au> wrote:
> > >
> > > > Dear Dr. Yazon,
> > > >
> > > > Just dropping a short note to follow-up my request to a survey of
> > physics
> > > > students and teachers at your school.
> > > >
> > > > I hope to hear from you soon.
> > > >
> > > > With kind regards,
> > > >
> > > > Francis
> > > >
> > > > --
> > > >
> > > >
> > > >
> > > >
> > > > --
> > > > JESSAMYN MARIE O. YAZON, Ph.D.
> > > > OIC, Office of the Campus Director
> > > > Philippine Science High School-Main Campus
> > > > Agham Road, Diliman, Quezon City, PHILIPPINES 1104
> > > > Telefax: (+632)-929-1606
> > > >
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>
> --
> JESSAMYN MARIE O. YAZON, Ph.D.
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> Telefax: (+632)-929-1606
>

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Francisco L. Ben
Research Scholar
School of Education
The University of Adelaide
245 North Terrace
Adelaide, SA 5005
Tel. 8303-7196

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JESSAMYN MARIE O. YAZON, Ph.D.
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Telefax: (+632)-929-1606

Date: Mon, 30 Jul 2007 10:37:54 +0800
From: Jessamyn Yazon <joyazon.pshs@gmail.com>
To: Francisco Ben <francisco.ben@adelaide.edu.au>
Subject: Re: follow-up email RE permission request

2 unnamed text/html 7.75 KB

Dear Francisco:

In principle your request is approved. However, may i suggest the following?:
1. send the questionnaires home to the students, once we know how many are willing to participate in the study? This is bec. our homeroom periods are also important meetings alloted for the Student handbook, student discipline, school-wide projects, etc. The HR teachers may not be willing to spend so much time devoted to completing your questionnaires.

2. please provide ample time for us to distribute and get back the parental consent forms before you give out the questionnaires.

thank you.
jessamyn

On 7/27/07, **Francisco Ben** <francisco.ben@adelaide.edu.au> wrote:

> Dear Dr. Yazon,
>
> I have attached of the consent form with a "return slip portion" to be signed by both the student participant and his/her parent. The "participant information sheet" that I sent you earlier is meant to be attached to the consent form. This participant information sheet broadly states the objectives of the study. I have not included permission request for taking pictures and video-recording because they are not part of the study.
>
> I have also attached to this email samples of the student and teacher questionnaires that I am going to give out. I am now in the final stages of validating the questionnaire items. "Big" as the questionnaire may seem at the moment, but I am sure I will be able to trim down the number of items to make the final version "smaller".
>
> Thank you for your consideration. It is much appreciated.
>
> With kind regards,
>
> Francis
>
>
> Quoting Jessamyn Yazon <joyazon.pshs@gmail.com>:
>
> > HI Francisco:
> >
> > in principle I am allowing you to conduct your study here. Please note that
> > since we are "handling minors", we have to ask permission from the parents
> > as to whether they will allow their kids to be part of the study. Your cover
> > letter for distribution to the students and parents should provide the
> > following info:
> > * study objectives
> >
> > a "reply slip portion" that the child can return to his/ her teacher
> > * space for parents to sign whether they:
> > agree that my child be part of the study
> > do not agree that my child be part of the study
> >
> > * space for child to sign in agreemnet as well
> > --> pls. include request permission to take pictures, or videos, if any.
> >