

March 2011

PICSE 2010 Impact Evaluation Report

*Primary Industry Centre
for Science Education*



Students excited to work hands on in the University Labs on Gel Electrophoresis (from left Madison, Brett, Sasha, Torrin, Joshua, and Jason).



Acknowledgements

Our thanks go to the students, staff and community members who completed the feedback sheets to provide these insights into the PICSE program. Thanks too to the PICSE team – the SEOs who ensured that information was collected and to the administrative personnel who entered the data into the system.

Our thanks also to Associate Professor David Russell who developed and provided the original feedback forms and assisted in modifying them to ensure that the best possible impact data could be captured and reported for this Report.

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Summary

PICSE aims to attract an increased supply of high quality young people to the agri-foods and fibre industries through engagement with them during school years and early university. It aims to make them aware that tertiary science courses are the entry point for such professional careers.

The PICSE program's strategy is based on raising **awareness** about career opportunities in these industries amongst students and those who influence them and creating an **interest / intention** in young people to seek specific science focussed career options in the agri-foods and fibre industries.

This evaluation report provides an analysis of impact data to provide a basis for assessing how well PICSE is progressing towards its goals.

Key Messages

Participation

Participation in the PICSE program is growing. It has significantly increased between 2009 and 2010 in all areas within its seven Activity Centres across Australia:

- 154 teachers were involved in the **teachers professional development program** in 2010/11 (up from 102 in 2009/10).
- 1082 students (primary and secondary schools) were engaged in the **Science Investigation Awards** (up from 331 in 2009/10). The numbers of judges and teachers involved in the program has also increased.
- 152 students were involved in **Year 11 and 12 Student Camps** (up from 120 in 2009/10).
- 136 students were involved in the **Industry Placement Scholarships** (up from 90 in 2009/2010).

Generating Awareness and Interest

There is strong data to show that involvement by students and teachers in PICSE activities is increasing the profile of science and primary industry opportunities and careers amongst the school community:

- Teachers who undertake **professional development activities** rated these as highly valuable, providing useful resources for their courses and increasing their interest and ability to encourage students to study science and seek careers in this area including the primary industries sector as the focus of 'science in action'.
- Students overall enjoyed their involvement in the **Science Investigation Awards** and rated their involvement as having a reasonable impact on their view of science and science studies – including having a clearer direction for the future.
- Most of the students who attended **Year 11 and 12 Camps** indicated that they had positively changed their attitudes towards studying science at university as a result of



Students on their Industry Placement Scholarship Program, in the Animal Biology Lab (from left Brett, Industry Mentor in Animal Biology, Tessa and Callum).

better understanding options and pathways. This was also mirrored in students who participated in Year 10 camps.

- Ninety percent of students who participated in the **Industry Placement Scholarships** indicated that they had changed their view on the importance of science in Primary Industries and a third who had not previously been interested, changed their career thinking towards science and primary industries.

Impacting on study and career options

The consistent message coming through the impact evaluation data is that the PICSE program is impacting on the choices that students are making – either by reaffirming their direction, providing clearer pathways, or moving them towards study and careers in science and primary industries where otherwise they would not have considered it:

- 22% of students attending **Year 11 and 12 Camps** had submitted an application for Agricultural Science and 54% for general science degree. 32% of students indicated that their involvement had increased their interest in undertaking post-graduate research.
- 46% of students involved in the **IPS scholarships** said they had enrolled or intended to enrol in a science/primary industry course.

The expansion of the **Science Investigation Awards** from a pilot program in 2009 to a PICSE-wide program during 2010 illustrates the ability of PICSE to undertake innovations that meet particular target audience needs.

Overall Message

The overall message from the results is that participation in PICSE is growing and the program is having a measurable impact on those teachers and students who have participated. The program is increasing interest in science within the schools in which it is operating and impacting positively on choices made by student participants in terms of post-secondary study, post-graduate study and careers.

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Purpose

PICSE aims to attract an increased supply of high quality young people to the agri-foods and fibre industries through engagement with them during school years and early university. It aims to make them aware that tertiary science courses are the entry point for such professional careers.

The PICSE program's attraction strategy is based on the key elements of – raising **awareness** about career opportunities in these industries amongst students and those who influence them, then to create an **interest / intention** in young people to seek specific science focussed career options in the agri-foods and fibre industries. PICSE also has data on **participation** numbers of young people who have graduated from the PICSE program – in terms of entering university and then entering careers in the agri-foods and fibre industry.

To undertake this process, PICSE provides an established program and strategy that includes science class activities, teacher professional development, student camps, industry placement and ongoing teaching resources. Collectively, these activities build strong and sustainable relationships with employers, science practitioners, educators and students (both primary and secondary with continued engagement at tertiary level).



PICSE UTAS student Dominique examining cucumber trials on work placement with Peracto, a national private sector R&D company who is a long-term PICSE partner.

What is PICSE?

The Primary Industry Centre for Science Education (PICSE) is a national collaborative partnership between the Commonwealth Government, universities, regional primary industries, national R&D Corporations, Cooperative Research Centres (CRCs), national agribusiness, regional research institutes, government authorities, local community organisations, schools and State Government Departments (www.picse.net). Its focus is to create an entry point to the supply chain of bright young people entering professional careers in Australia's increasingly vibrant, globally focused and quality conscious food and fibre industries.

The PICSE program is managed from the University of Tasmania with a national brief. A core of professional personnel manages its operations, evaluation and innovation activities from the national centre based in Burnie, Tasmania. A group of full and part-time Science Education Officers (who are almost with exception experienced teachers) based at partner universities and in primary industry centres in regional Australia manage the operations. These are to link with schools, support in-class programs with cooperating teachers/schools, develop curriculum focussed support materials, link with handpicked employers to demonstrate 'real careers' and support students through their suite of activities during the year.

How PICSE is being evaluated

The evaluation program of PICSE seeks data on two key areas. The first is the Impact of the PICSE program in terms of how it is meeting its aims. The second is the Process of how the program is managed operationally. The purpose of the Impact reporting is to demonstrate to investors and partners the level of success being achieved. The purpose of the Process reporting is to undertake a program of continuous improvement in context of the PICSE ethos of continued innovation.

The results

Results are summarised according to the different activities undertaken by PICSE :

- Science Teacher's PD
- Science Investigation Awards (SIA)
- Year 11 and 12 Student Camps
- Industry Placement Scholarships (IPS)
- Student study choices post PICSE

Each activity is analysed for impacts, variations between Activity Centres and changes in trends over the previous 12 month period. Details of the quantitative data and associated graphs are included in the appendices of the report. There are separate reports for activity in each Activity Centre.

Note that a scale of 1-10 has generally been used for questions. Ratings from 5-7.5 are considered to be average to high, those between 7.5 and 8.5 are considered to be at a high level and rankings over 8.5 are considered to be very high / excellent.

The results presented are summarised as:

- The **Teachers' PD** focuses on increasing the understanding of teachers about the importance and value of the science being used in primary industries and how this relates to student career opportunities in the agri-food and fibre industries.

In general, all teachers found the PD activities to be very valuable (with an average rating range of 8.8 to 9.6 out of 10). They also found the PD very useful in helping teach science (average rating of 8.7 out of 10).

Overall, teachers indicated that the likely impact of their participation in the PD on their students would be the ability to help encourage students to continue to study science and advise them about study and/or career opportunities. The two main actions teachers indicated they might undertake as a result of the PD were incorporating the information and resources they had gained into their units, and organising more out-of-class activities and inviting more guest speakers to classes. It is noteworthy that the teachers PD inspired teachers to plan to undertake specific identified teaching actions that arose from their work with PICSE such as activities in their schools or in their classroom programs.

The results show an **increased number of participants over the last year from 102 to 154**. The program is considered to be 'very valuable' and very useful in teaching science and very likely to impact to students. The two main actions teachers indicated they might undertake as a result of the PD were incorporating the information and resources they had gained into their units; and organising more out-of-class activities and inviting more guest speakers to classes

- The **Science Investigation Awards (SIAs)** are focussed on raising awareness amongst students and influencers about the role and function of science in the agri-foods and fibre industries. This is achieved through students undertaking unique personal investigations of science in action.

Overall students indicated that they quite enjoyed the SIA program. Students overall rated their involvement in the SIA program as having a reasonable impact on their view of science and science studies. Just under half of secondary students were already interested in study/career in science, primary industries or environmental studies. Most of these indicated that their general interest had increased while the rest said that they now have a clearer direction.

The **number of student participants in 2010 compared to 2009 was up 227% to 1,082 participants** at both primary and secondary schools levels due to expansion from a pilot program to a 'PICSE wide program' as a result of the success of the pilot. There was also a slight upward trend in the level of enjoyment by students of the SIAs and a moderate overall upward trend on their view of science and science studies as a result of participation in the SIA program. The number of judges increased across the board with participants generally maintaining their perception that the PICSE program is having a high impact on students. The belief that the SIA promoted positive engagement and a learning experience for students was consistent over the last two years as was the judges' continued interest in future involvement.

- The value of the **Year 11 and 12 Student Camps** is for the students to gain practical personal experience of agri-foods and fibre careers in action. They are placed with handpicked employers who are briefed to ensure an understanding of the science of those professions and to demonstrate future opportunities that are exciting and satisfying, generally with a focus on issues such as food security or environmental sustainability.

Those students who changed their attitude towards studying science at university (72%) as a result of the IPS camp, commented that they now better understood what options and pathways for studying science at university were available to them. Students also mentioned an increased awareness of what career opportunities were available and expressed an increased excitement for studying and working in science. A large proportion of students mentioned they were already interested in studying science and now had clearer direction and more focus for what they wanted to pursue. Many students also indicated their interest specifically for studying Ag Science. Students that indicated they hadn't had a change in attitude generally commented that they were already interested in studying science at university.

Since 2009 **there has been an overall 27% increase in numbers of student participants from 120 to 152**. In that time there has been an overall 7% increase to 72% in changed attitudes of students towards seeking to study science at university (as the first step in their entrance to university courses that lead to careers in the agri-foods or fibre industries). This is due to a better understanding of the options and pathways available for studying science at university, an increased awareness of the career opportunities available, an increased excitement for studying and working in science and clearer direction and focus, noting that 27% were already interested in science. There



PICSE USQ students Steven and David examining bugs during camp.

was also a large increase in the level of students in pursuing careers in primary industries.

- Three Activity Centres run **Year 10 Camps** in order to secure the attention of students regarding potential careers as they enrol in Year 11 subjects. Of the **74 students who participated in Year 10 camps**, most (87%) indicated that their interest in studying science at school had increased as a result of attending the camp. This was due to the interesting and enjoyable activities and their better understanding of the wide variety of opportunities available for science related studies and careers. The small number who had not had an increased interest, were either already very interested in science or had no change in their disinterest for science.

Over half (55%) indicated that they had changed attitude towards careers in primary industry, due to the knowledge they gained from the camp about opportunities available and diversity of the primary industries. Many indicated that primary industry now looked more interesting to them.

- The **Industry Placement Scholarships (IPS)** are the overarching avenue in which students apply to be accepted into the hands-on experiential component of the PICSE program. They are paid a small stipend that facilitates their attendance at both the Year 11 and 12 camps and the week-long personal industry placement direct with an employer. The IPS is a key component of the PICSE program due to its high level experiential nature.

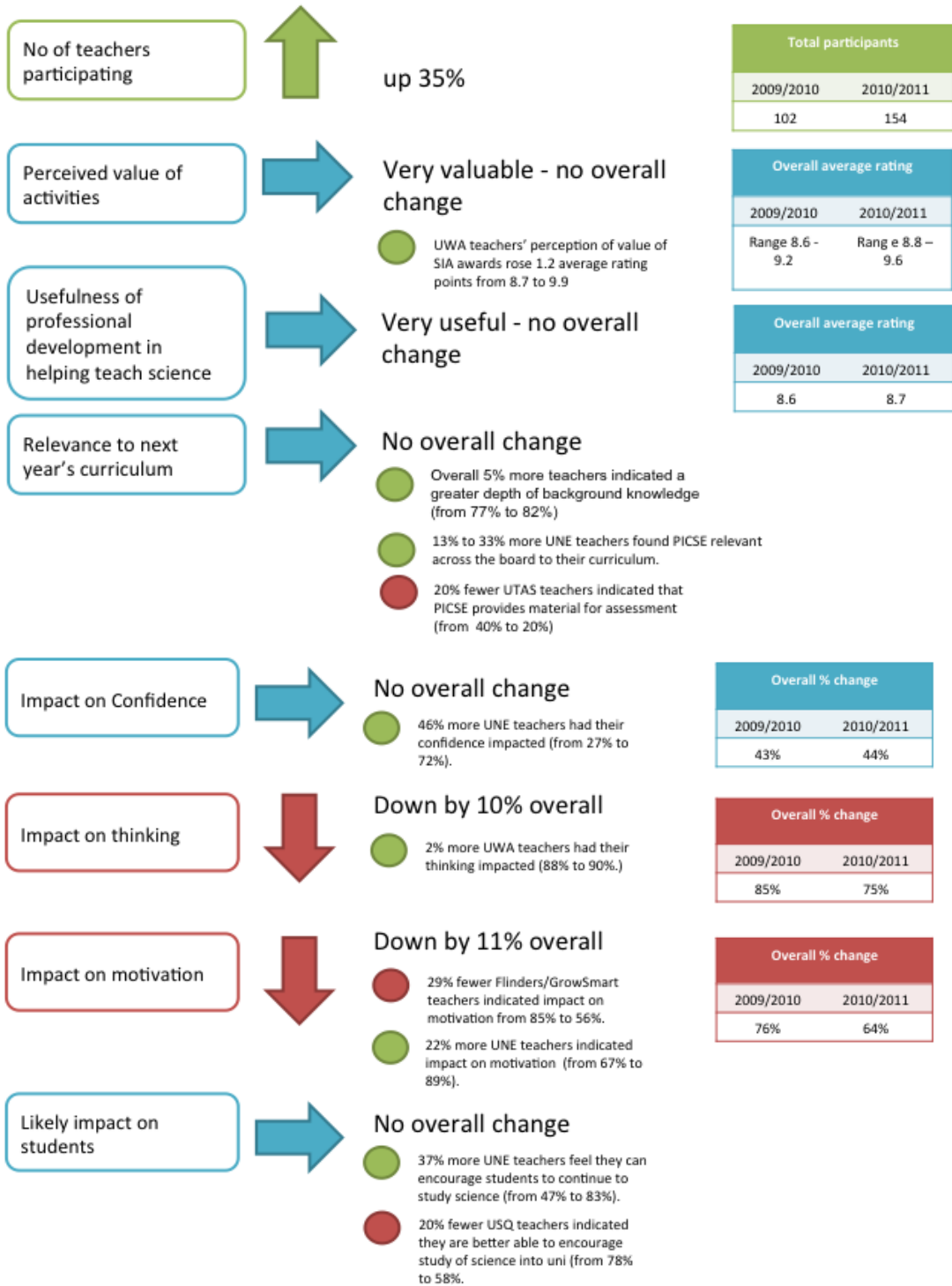
Most (90%) participating students indicated that Industry Placement had changed their view on the importance of science in primary industries. Almost one third (31%) changed their opinion about studying/seeking a career in science or primary industry and they were now more interested as a result of IPS. Just over one third (35%) said that they now had a clearer direction for the future. Students commenting on positive gains in knowledge, understanding and experience (particularly relating to science and Ag science) and made numerous mentions regarding their level of enjoyment of the Industry Placement, the new friendships made, a better understanding of the career opportunities available, as well as being able to make valuable industry contacts. Overall 87% of students were enrolled or intend to enrol in a science / primary industries related university course and those who changed their mind noted it was due to a better understanding of the careers available and an appreciation for the enthusiasm and passion shown by those in the working in the industry.

The **number of participants was up 51% on 2009 to 136 students** – again based on Activity Centres seeking to maximise numbers to the quality threshold. An increased interest to 90% in the importance of primary industries occurred with almost one third changing their opinion to now being more interested in studying science / careers in primary industries and just over one third being more clear on their future direction.

Science Teachers' Professional Development

What has changed since 2009/2010

OVERALL PICSE Teacher PD scorecard 2009/2010* -2010/2011



* USC not included in 2009 data. This does not impact % comparisons.

Results from 2010/2011¹

Usefulness and value of PD

In general, all teachers found the PD activities to be very valuable (with an average rating range of 8.8 to 9.6 out of 10). They also found the PD very useful in helping teach science (average rating of 8.7 out of 10). Comments were consistently positive across all activity centres. Respondents praised the PD for providing tools, ideas and resources, which could be used in lessons during the upcoming school year. Some respondents expressed that the PD was the highlight of their year and 're-enthused' them for the upcoming school year. There were specific mentions to the quality of the PowerPoint presentation, the opportunity to network and also the relevance of the information to the 'real world'. While not being particularly negative, some respondents indicated that the content was not relevant to their current curriculum. One respondent however (from **Flinders**) mentioned that they had not gained as much from the PD as in previous years.

Relevance to next year's curriculum

Overall teachers felt that the PD activities were mostly providing a greater depth of background knowledge for the subject (82%) and activities and resources (83%). General comments relating to the relevance of the PD to next year's curriculum were uniformly positive and praised the information and resources provided, noting their potential usefulness in the classroom. Respondents from **USC** particularly mentioned the value of 'leading edge' science in further helping their understanding. Another respondent from **UTAS** believed the main value was 'seeing career opportunities' that would help guide or counsel students. There were two suggestions from **USQ** respondents, with the first suggesting that the PD was 'more relevant to Ag Science than Science', while the other suggested that more time could be spent on particular topics.

Impact on thinking, motivation and confidence

Across the activity centres, teachers rated that their thinking (75%) and motivation (64%) were most impacted by participating in the PD. Respondent

Always useful and inspired me/my teachers to try new approaches/contexts. (UWA)

Good links to what is happening "real world". (UTAS)

Very useful and inspirational! Have some great ideas for my classes! (USQ)

It will be very useful for the relevant outcomes. (UNE)

An extremely enjoyable and useful exercise. (PICSE GrowSmart)

In previous years I have gained ideas of constant prac activities etc that I can immediately take back to the class room but not so much this year. (Flinders)

It is always great to have new lab ideas - different stories and perspectives on climate change and good tools to take to the classroom. (UWA)

Main value is in seeing career opportunities etc for use in counselling/guiding students. (UTAS)

I suggest spending a whole morning or afternoon on a topic. i.e. introduction, laboratory exercise or tour, possible applications in the classroom (plus resource distribution). (USQ)

It's always valuable to find out about leading edge science and networking. (USC)

Great info, will use activities. (GrowSmart)

The Organic Chem. CD looks useful. (Flinders)

¹ Charts with ratings for each activity centre are in the Appendix. Full lists of comments are available in the individual activity centre reports.

comments expressed feelings of being more inspired, stimulated, motivated and confident, through the gain of new knowledge and viewpoints.

There was particular mention regarding information on climate change with an **UWA** respondent noting a 'new positive spin on climate change', while an **UNE** respondent was now 'keen to get into the climate challenge' whereas prior to the PD they had been uncomfortable. The respondents from **GrowSmart** praised the quality of the presenters, describing them as 'very inspiring' and 'really excited about what they do'. Another **GrowSmart** respondent described the PD as 'a relaxing environment to refuel and have good chats with participants'.

Likely impact on students

Overall, teachers indicated that the likely impact of their participation in the PD on their students would be the ability to help encourage students to continue to study science (84%) and advise them about study and/or career opportunities (82%)².

Actions taken as a result of attending PD

The two main actions teachers indicated they might undertake as a result of the PD were incorporating the information and resources they had gained into their units; and organising more out-of-class activities and inviting more guest speakers to classes. These main actions were particularly prominent in comments from the **UTAS**, **USQ** and **GrowSmart** locations. Other actions that were mentioned included: encouraging student involvement; considering teaching new subjects or units; sharing knowledge with or encouraging colleagues; further personal education or learning; and upgrading school infrastructure resources with suggestions such as 'planting an orchard' and 'installing solar panels'³.

*My horizons have been broadened.
Determination to see students involved. (UWA)*

Greater degree of passion and motivation for science careers in Tasmania. (UTAS)

Can be 'cut off' from cutting edge research in schools this shows what is going on in the 'real world'. (USQ)

The content certainly adds weight to what I am doing. (USC)

More practical confidence. Also different thinking re climate change (more concerned!). (UNE)

Excellent presenters - all really excited about what they do. (GrowSmart)

Encourage students to be more involved in science and to think more, to be investigative and more understanding of science for their future. (UTAS)

Try and organise an excursion to the DPI/Have someone come to visit the classroom. Be involved (student excursion) to "Mouldy Murder" sounds amazing. (USQ)

Installing solar panels - encouraging others (students +) to work towards reducing carbon emissions. (USC)

Use updated resources/access network for help. Intro some new experiments. Encourage Y10 to consider applying to PICSE. (UNE)

Will use some of the prac activities. Will try to get students involved in the science camp. (GrowSmart)

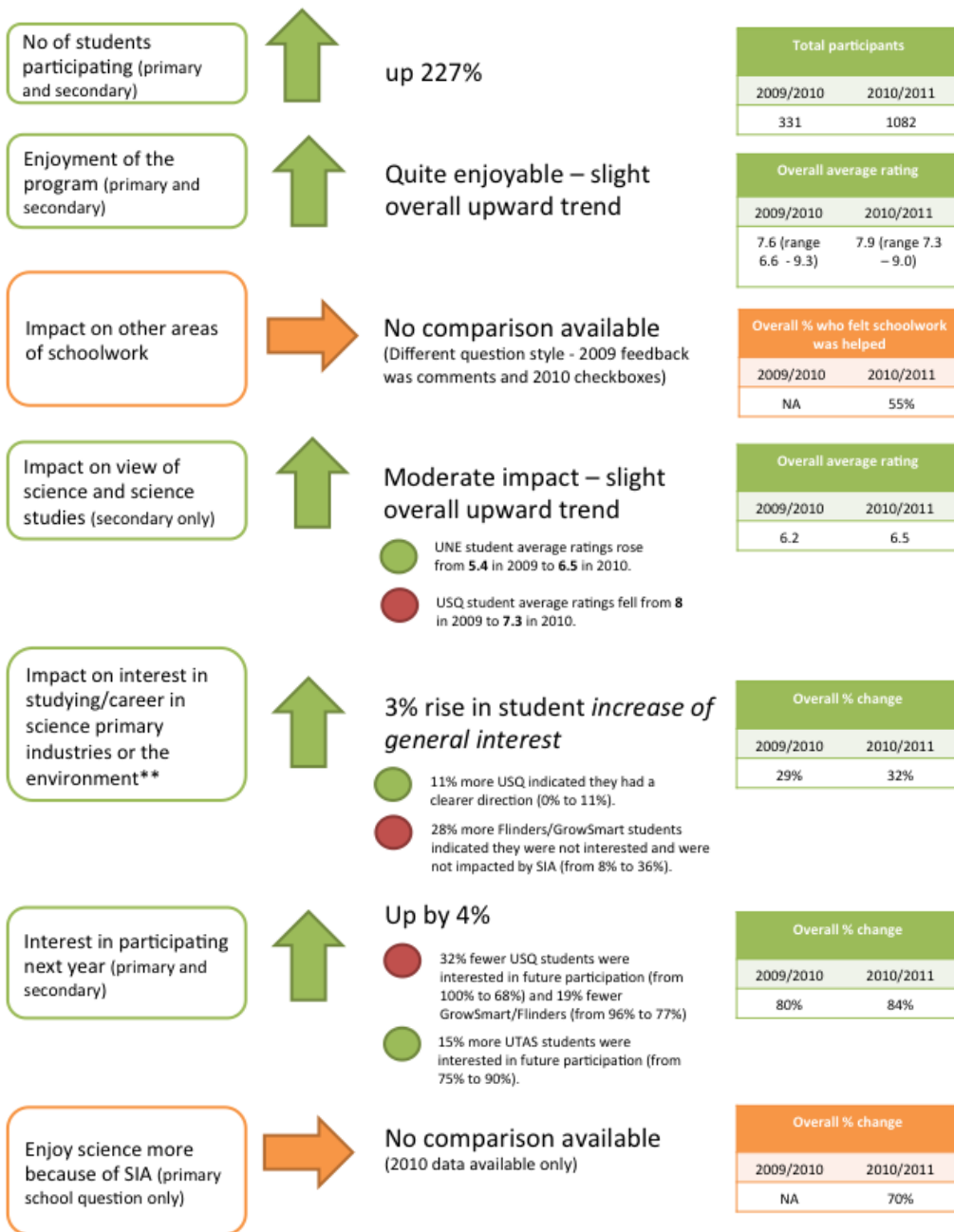
² See Appendix for chart including all activity centres

³ All teacher comments from all activity centres are available in the individual activity centre reports

Science Investigation Awards (SIA)

What has changed since last year (students only)

OVERALL SIA **student** participant scorecard 2009/2010* - 2010/2011



* Cotton CRC and USC not included in 2009/2010 data ** 2009 data includes primary school students / 2010 data secondary students only answered this question

(Please note that the sharp increase in participation is due to SIA pilot program in 2009 being fully implemented during 2010).

What has changed since last year (teachers and judges)⁴

Judges

Over 2009 and 2010, the number of judges participating in the SIA awards increased across the board with participants generally maintaining their perception that the PICSE program is having a high impact on students. The belief that the SIA promoted positive engagement and a learning experience for students was consistent over the last two years as was the judges' continued interest in future involvement.

Overall this feedback did not vary to a great degree across activity centres, however, a few changes were noted.

Flinders/GrowSmart⁵

- Judge participation **increased** by 200% from 2009 to 2010 (up from 5 to 15).
- The belief in the importance of judging materials fell between 2009 (average rating 9) and 2010 (**average rating down** from 9 to approx. 7.5).

UNE

- Judge participation **increased** by 233% from 2009 to 2010 (up from 6 to 20).
- The judges' belief in the importance of judging materials **rose** between 2009 and 2010 (**average rating up** from 6.8 to 7.8).
- There was a rise in the rating Judges gave to the usefulness of the pre and post SIA briefing sessions (**average rating up** from 6.4 to 7.8).

USQ

- Judge participation **increased** by 400% from 2009 to 2010 (up from 2 to 10).
- There was a fall in the rating judges gave to the scientific and educational soundness of the judging process (**average rating down** from of 9.5 to 8.1).

UTAS

- Judge participation **increased** by 40% from 2009 to 2010 (up from 52 to 73).
- There was a slight rise in the judges' belief in the scientific and educational soundness of the judging process (**average rating up** from 7.5 to 8).

UWA

- Judge participation **increased** by 13% (up from 16 to 18)
- There was a slight fall in judges' rating of the educational soundness of the judging process (**average rating down** from 7.2 to 6.7).
- There was a slight rise in the judges' belief of the importance of the judging materials (**average rating up** from 7.9 to 8.6).

Teachers

Over 2009 and 2010, teacher participation increased across the board with participants generally indicating their perception to be that the PICSE program has had a relatively high impact on students. There has been a consistent belief across activity centres that SIA positively engaged students previously uninterested in science. The few who indicated no positive engagement, tended to comment that their students were already interested in this area. Teachers have also maintained their interest in continued involvement in the awards.

As with the judges, this feedback did not vary too much across activity centres, however changes noted included:

Flinders/GrowSmart

- Teacher participation **increased** by 125% from 2009 to 2010 (from 4 to 9)
- In 2010, teachers seem to place more importance on the PICSE materials (**average rating up** from 6.3 to approx. 7.4) than in 2009.

⁴ Judge and teacher responses are included in full in individual activity centre reports for the SIA program.

⁵ Please note that in 2009 Flinders/GrowSmart were grouped together whereas in 2010, they were treated separately

- In 2010, teachers believe that the experience has more impact on student's interest in science as a study area (**average rating up** from 6.0 to approx. 8.3).

UNE

- Teacher participation **increased** by 33% (from 6 to 8)
- Belief that the experience impacted on students' interest in science as a study area rose between 2009 and 2010 (**average rating up** from 6.8 to 8.3).
- Belief in the value of the SIA in maximising program benefits fell between 2009 and 2010 (**average rating down** from 9.8 to 8.9).

USC

- Teacher participation **increased** by 300% (from 1 to 4)
- A comparison across average ratings with only one participant from 2009 is inappropriate.

UTAS

- Teacher participation **increased** by 111% (from 9 to 19)
- There has been very little change in teacher impact ratings from 2009 to 2010.

UWA

- Teacher participation **increased** by 25% (from 4 to 5).
- There was a fall in the teachers rating of usefulness of the SEO Officers between 2009 and 2010 (**average rating down** from 9.5 to 8.4).
- Belief that the experience impacted on students' interest in science as a study area rose between 2009 and 2010 (**average rating up** from 7.5 to 8.4).
- There was a rise in teachers' belief that the program contributed to a positive learning experience between 2009 and 2010 (**average rating up** from 7.5 to 9.4)

Results from 2010/2011 (students only)⁶**Enjoyment of the SIA**

Overall students indicated that they quite enjoyed the SIA program (average rating of 7.7 out of 10). Primary school students on average rated that they enjoyed the program more than secondary school students (the former average rating 8.3 and latter 8.3). Many mentioned they enjoyed the practical activities, experiments and learning new things. There were a few who said they enjoyed seeing other students' projects and meeting like-minded people. There was also enjoyment of the 'freedom' of being able to work alone and choose 'their own' topics.

The majority of primary school students (70%) indicated that SIA had increased their enjoyment of Science.

Students indicated that they least enjoyed actually doing and writing up the work, short timeframes and the length of time it took to complete projects. There was some mention of long waits in the judging process.

Being able to choose our own investigation. (UWA)

Discovering new and different results about different antibiotics and bacteria. (UTAS)

I really liked the activities and some of the people that I met and that's what I enjoy. (USQ)

It was great to see the quality of science assessment and also to receive feedback from people not within your school. (USC)

The time we had to wait from handing in the report and getting judged. (UNE)

⁶ Full lists of student responses are available in individual activity centre reports. Charts collating cross activity centre results are available in the Appendix of this report.

Impact on other areas of schoolwork

In general, both primary (86%) and secondary (71%) school students indicated that the SIA program helped them in other areas of their schoolwork. Respondents commented that they had gained new knowledge and inspiration in subject areas, learnt to work on their own and in teams as well as how to write reports and set out projects. Some commented that the SIA work took them away from other subjects.

Impact on view of science and science studies

Students overall rated their involvement in the SIA program as having a reasonable impact on their view of science and science studies (overall average rating 6.3 out of 10). **USQ** students rated the highest level of impact (average rating 7.3) and the **Cotton CRC** the lowest (average rating 5.3). Many students commented that they were already interested in science. Others said that it made science more fun and accessible, expanded their perceptions and that they learned interesting things that increased their interest. Some also commented that they were now more aware of how science is applicable to the world around them.

Impact of interest on study/career (secondary students only)

Just under half (43%) of secondary students were already interested in study/career in science, primary industries or environmental studies. Most (32%) indicated that their general interest had increased while the rest said that they now have a clearer direction (11%). Of those who indicated no change, 27% were already interested and 24% had no interest.

Those who were not interested generally already had their minds made up regarding their careers and this did not change based on their participation. Those who said that their general interest had increased commented that science now seemed more fun and there were a number of students providing examples of the types of science careers they would like to pursue, for example: anthropology, sport science, astronomy, agriculture, chemistry, and environmental sciences.

Although I was interested in science before, I have wider, more varied thoughts on science and studies. (UWA)

I didn't think this was going to be good, now I want to do it again. (UTAS)

My views on science have always been positive and therefore have not been impacted. (USC)

It is more interesting now you understand why things happen. (UNE)

I'm good at science but the project didn't make me enjoy it much more than I did already. (GrowSmart)

I would like to do something at uni to do with science such as sports science or human biology. (UWA)

I enjoy science at school but I don't think I will make it my career choice. (UTAS)

I would really love to study science now. (USC)

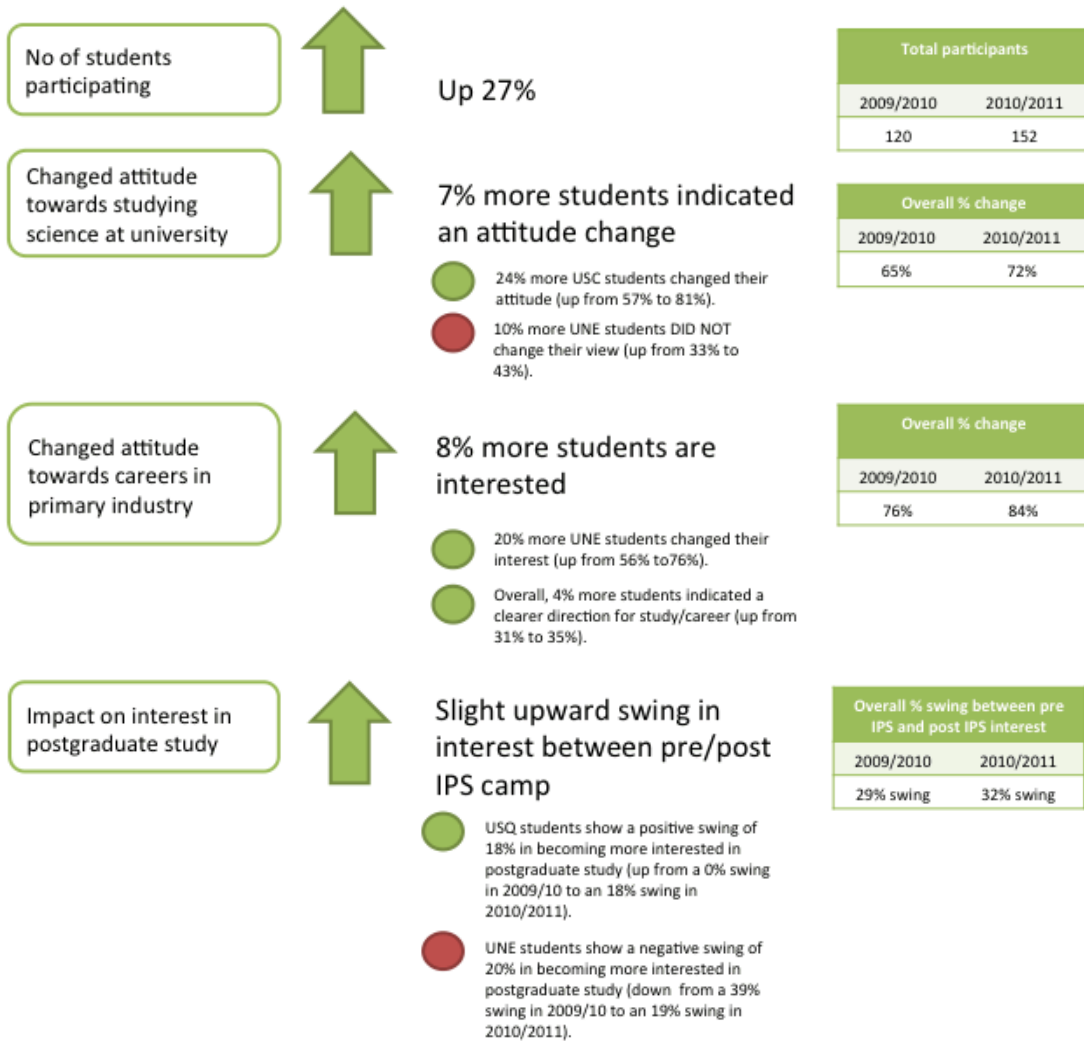
I am planning to get a job at the Berri Estates working in the lab. (GrowSmart)

I'm considering taking science to my HSC. (Cotton CRC)

Year 11 and 12 Student Camps

What has changed since last year⁷

OVERALL PICSE IPS camps scorecard 2009/2010 - 2010/2011



⁷ The swing reported on for the impact on interest in postgraduate study relates to the % of students who changed their mind as a result of the camps. i.e. in 2010/2011 52.6% of students were interested in postgraduate study prior to IPS and 84.2% were interested post IPS – a swing of 31.6%.

IPS Camp results from 2010/2011⁸

Attitude change towards studying science at university

Those students who changed their attitude towards studying science at university (72%) as a result of the IPS camp commented that they now better understood what options and pathways for studying science at university were available to them. Students also mentioned an increased awareness of what career opportunities were available and expressed an increased excitement for studying and working in science. A large proportion of students mentioned they were already interested in studying science and now had clearer direction and more focus for what they wanted to pursue. Many students also indicated their interest specifically for Ag Science.

Students that indicated they hadn't had a change in attitude (27%) generally commented that they were already interested in studying science at university.

Change in attitude towards careers in primary industries

The major themes which emerged from comments made by students who had changed their attitude towards careers in primary industry (84%), was the realisation of how broad the primary industries actually are; its importance to other industries, the environment, and the wider community; and the wide array and diversity of jobs available. These comments were reflected fairly evenly across all camp activity centres.

Interest in postgraduate study

All activity centres showed an increase in student interest in postgraduate study as a result of the IPS camp. The biggest swing was in **UWA** (increase of 43% in student interest).

More year 11 students indicated that they were planning to study general science (63%) than agricultural science (39%) specifically. 22% of Year 12 students had submitted an application for ag science and 54% had applied for a general science degree.

I am much more interested and informed about university. (UWA)

I was always interested in science, it's reassured me that a vet is my first option but Ag Science is definitely my second option. (UTAS)

It has broadened the scope of what I wish to study. (USQ)

Showed me a wider range of areas and industries I can use my skills in and what I could do with certain degrees. (USC)

I already wanted to do science but this program has encouraged me to come to UNE and showed me many new things. (UNE)

I came on camp to get an idea of if I would like a career in Science and it has opened my eyes to a lot of fields I could study. (GrowSmart)

⁸ A full list of comments for all IPS camps is available in individual activity centre reports. Overall collated charts are in the Appendix of this report.

Year 10 Camp results from 2010/2011

74 students participated in Year 10 camps across three activity centres – UWA, USC and Flinders/GrowSmart.

Impact on interest in studying science at school

Most students (87%) indicated that their interest in studying science at school had increased as a result of attending the camp. Comments indicated that this was due to the activities which they found interesting and enjoyable. Students also commented that they now had a better understanding of the wide variety opportunities available for science related studies and careers. The small number who had not had an increased interest, were either already very interested in science or had no change in their disinterest for science.

It has given me some future science pathways to strive for. (UTAS)

Because it showed me how cool it would be to work in the marine industry. (USC)

I have seen some new areas of science I didn't know about before. (Flinders/GrowSmart)

Impact on attitude towards careers in primary industries

Over half (55%) of year 10 students indicated that they had changed attitude towards careers in primary industry. They commented that this was due the knowledge they had gained from the camp about opportunities available and diversity of the primary industries. Many indicated that the primary industry sector now looked more interesting to them. Those who had not changed their attitude (29%), indicated they were either already interested in the primary industries or were interested in other scientific fields.

Yes! I never knew there were so many science opportunities. (UTAS)

It hasn't completely changed my ideas, but it has shown the uses and necessity of these industries. (USC)

I saw many new opportunities in these industries. (Flinders/GrowSmart)

Impact on interest in studying science at university

There was little change between students interest in studying science at university as a result of the camp. 70 Students were interested prior the camp and 68 post the camp. Those who indicated that they were interested post the camp pointed towards an increased knowledge and understanding of the opportunities available in science as being a major factor. They also commented that the camp had made science look fun and interesting and confirmed many students' love of science. Students who were uninterested, indicated that they were either already very interested in studying science, or never had any intention to study science.

Because it can be fun, interesting and worthwhile. (UTAS)

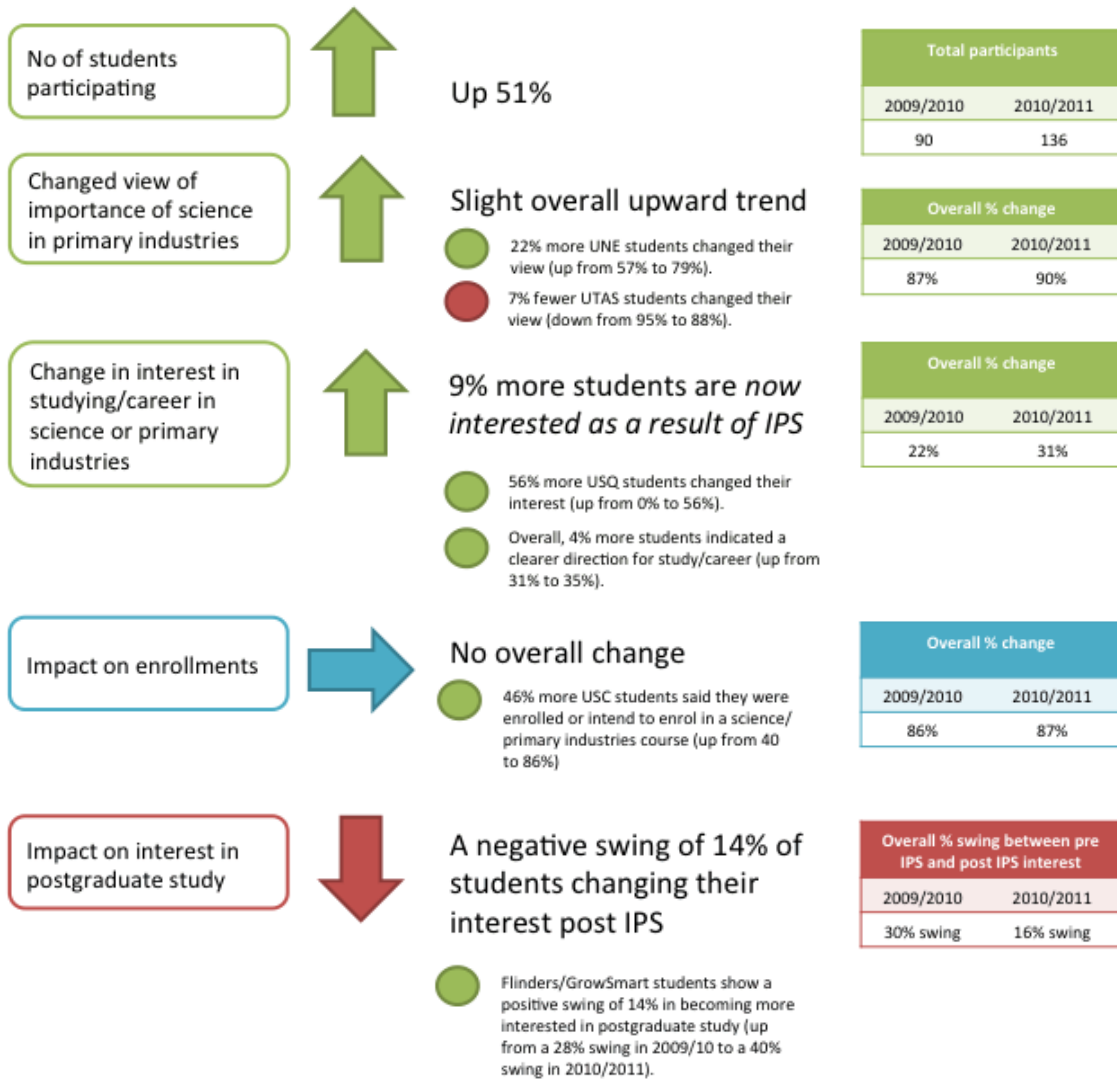
PICSE made science interesting (USC)

Visiting the universities gave me an idea of how interesting and fun it could be. (Flinders/GrowSmart)

Industry Placement Scholarships (IPS)

What has changed since last year⁹

OVERALL PICSE IPS scholarships scorecard 2009/2010 - 2010/2011



(Please note that the strong increase in participating students is due to the 2009 IPS pilot program being fully implemented in 2010.)

⁹ The swing reported on for the impact on interest in postgraduate study relates to the % of students who changed their mind as a result of IPS overall. i.e. in 2010/2011 55% of students were interested in postgraduate study prior to IPS and 71% were interested post IPS – a swing of 16%.

Overall results from 2010/2011¹⁰

Gains made from IPS

When asked what they had gained from the Industry Placement Program, students across all activity centres provided similar responses, commenting on gains in knowledge, understanding and experience (particularly relating to science and Ag science). Students also made numerous mentions of having enjoyed the Industry Placement and the new friendships they had built as a result. A better understanding of the career opportunities available, as well as being able to make valuable industry contacts were also mentioned.

Most beneficial part of IPS to thoughts about the future

Most (90%) participating students indicated that Industry Placement had changed their view on the importance of science in primary industries. Almost one third (31%) changed their opinion about studying/seeking a career in science or primary industry and they were now more interested as a result of IPS. Just over one third (35%) said that they now had a clearer direction for the future.

The opportunity to talk to people such as scientists and those working in the industry was described by many across all activity centres as being one of the most beneficial parts of the industry placement program. The work placement and the ability to get hands on experience and see the industry first hand was also seen by many students as being highly beneficial to their thinking.

Major factor behind a change of mind

Although the majority indicated they were already interested in studying science or primary industries and 87% were enrolled or intended to enrol in relevant courses, those who did change their mind as a result of IPS commented that this resulted from a new perspective on the industry, coming from a better understanding of the careers available and an appreciation for the enthusiasm and passion shown by those in the working in the industry. Students from **USQ** particularly mentioned the enjoyment they had learning, which was particularly due to the friendly and passionate people from the industry who took the time to help them.

Being immersed in a field that I had an interest for and surrounded by people who shared my passion. (UWA)

The wide range of Industries I got to observe so I could see where I could see myself working. (UTAS)

It made me realise what research is all about. Very interesting. I am definitely considering research as a career path. (USQ)

Talking with people and hearing about their paths into science. (USC)

The Industry Placement, talking to my hosts about their jobs. (UNE)

Being able to sit in on meetings and see the day to day happenings. (GrowSmart)

The lecturers and my industry placement associates who were very enthusiastic and informative. (UWA)

Research involved. (UTAS)

Friendly people with the willingness to take someone and train them. (USQ)

I now know the opportunities. (USC)

The range of careers available. (UNE)

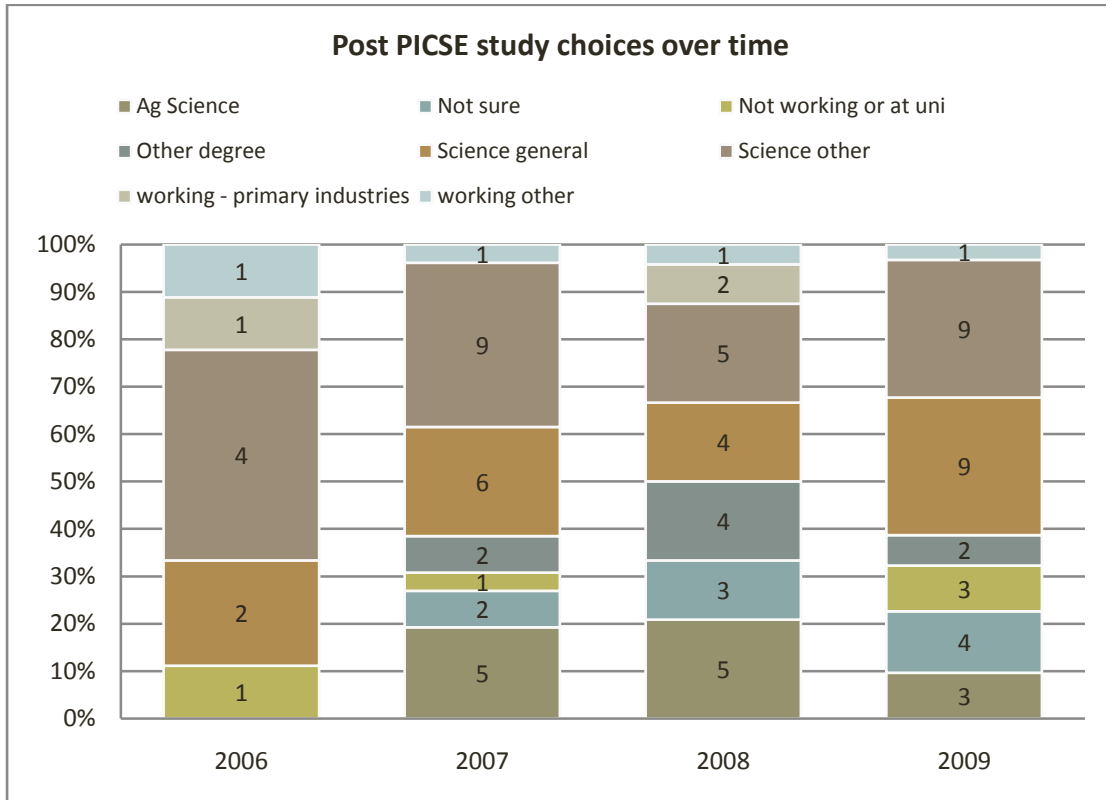
The work placement gave me a great experience. (GrowSmart)

The expanded view of options. (Flinders)

¹⁰ A full list of comments is available in individual activity centre reports. Overall collated charts are in the Appendix of this report.

Student study choices post PICSE

Efforts are being made to track actual student enrolments in university courses – or careers - post secondary school. A short survey was sent from some SEOs via SMS to past grade 12 students who were participants in the PICSE program. This graph is based on the first SMS survey results from South Australia. Other survey data is being compiled.



The graph shows that a high proportion of students are actively engaged in agricultural and other science based courses.

The following table shows the total students enrolled in varied science and agricultural-related courses between 2006 and 2009.

Institution and course	2006	2007	2008	2009	Grand Total
Adelaide University	4	14	14	9	41
B Ag Sc		5	5	3	13
B Animal Sc		2	1	2	5
B Computer Sc	1	1			2
B Env Science	1				1
B Food nutrition Sc	1				1
B Vet Science			1		1
BSc		4	3	2	9
Engineering		1	1	1	3
Working in primary industries	1				1
Health related Degree		1	1		2
B Education			1		1
B International Studies			1		1
Double degree including science				1	1

ADFA	1				1
Graduated - science degree	1				1
ANU		1			1
BSc		1			1
Ballarat Uni		1			1
Engineering		1			1
Charles Darwin		1			1
Health related Degree		1			1
Flinders University	2	3	1	7	13
B Computer Sc			1		1
B Env Science		1		1	2
B Marine Sci/aquaculture				2	2
BSc	1	1		3	5
Engineering				1	1
Working in science industry	1				1
Health related Degree		1			1
James Cook Uni - Cairns				1	1
Health related Degree				1	1
Monash University				1	1
Health related Degree				1	1
NA	2	3	6	6	17
Gap year				1	1
Not sure		2	3	4	9
Traineeship		1			1
Working - other	1		1		2
Working in primary industries			2		2
Dropped out	1				1
Deferred				1	1
Not advised		2			2
BSc		1			1
Dropped out		1			1
Regency TAFE				1	1
Traineeship				1	1
St Johns - Whyalla				1	1
Repeating year 12				1	1
Uni SA		3	1	5	9
BSc				2	2
Industrial Design		1			1
Health related Degree		2	1	2	5
Double degree including science				1	1
Grand Total	9	26	24	31	90

Appendix

Please note all charts below are colour coded according to the below key.



Appendix 1: Teacher PD overall data 2010

Chart 1: Gender of participating teachers

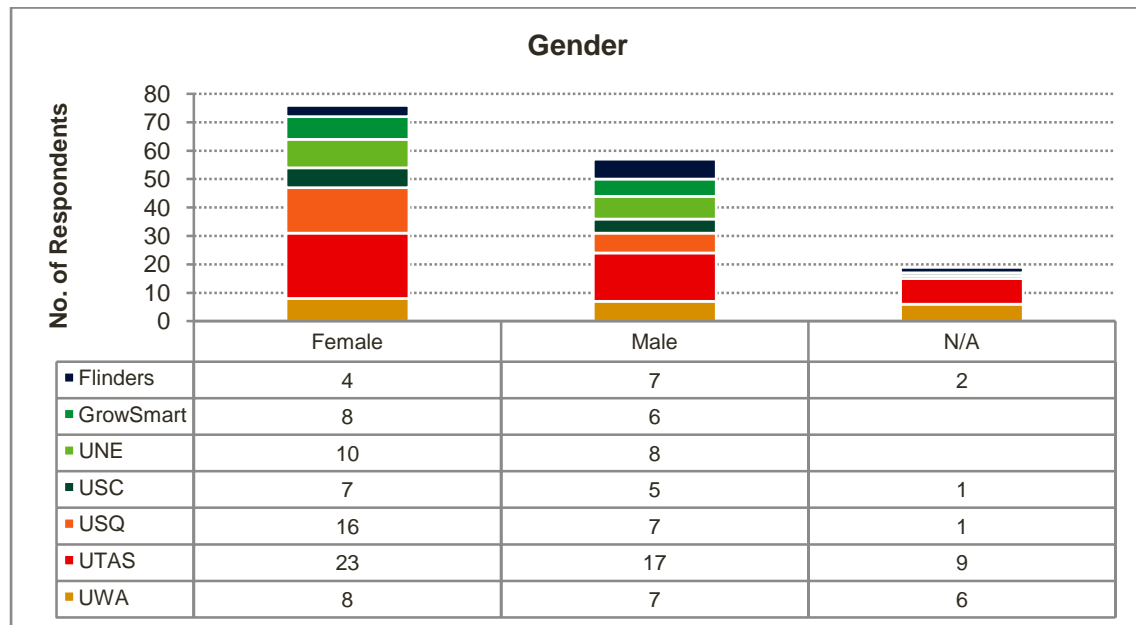
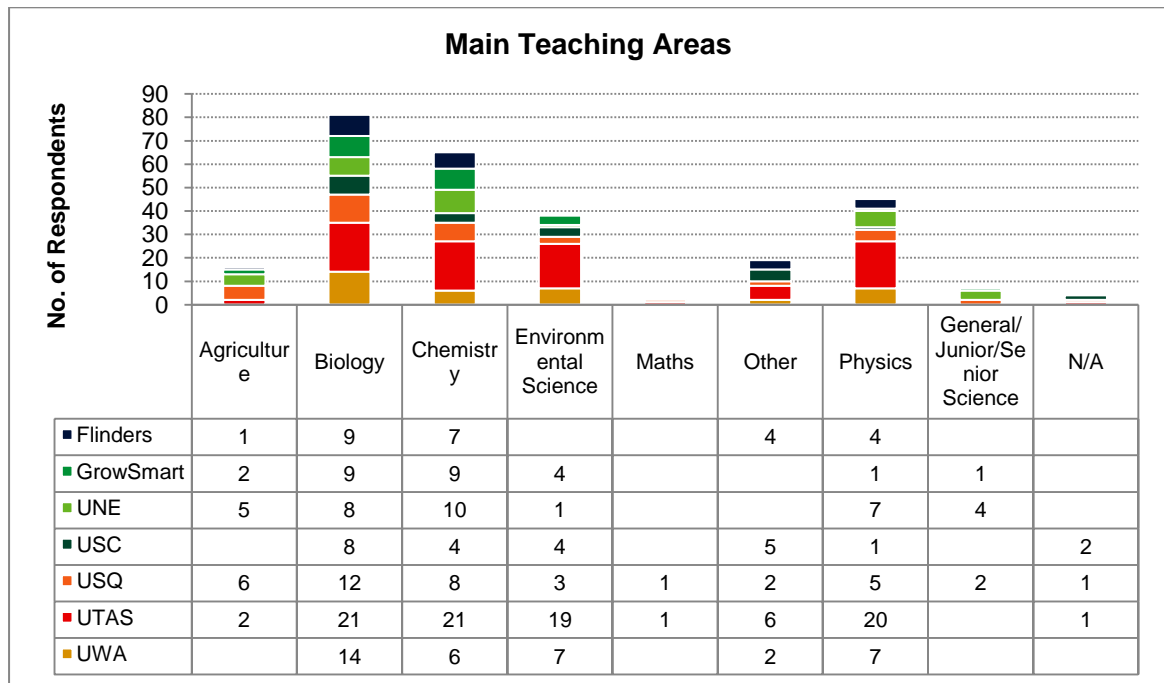


Chart 2: Main teaching areas of Teacher PD participants 2010/2011



Where respondents indicated 'Other' as their year group taught, the majority indicated they were either lab technicians or worked in science at primary school level. Some other examples of 'Other' responses include: 'ITAS', 'Boarding home mentor', 'Communication Engagement Education', and 'Environmental Education'.

Chart 3: Overall year groups taught by participating science teachers 2010/2011

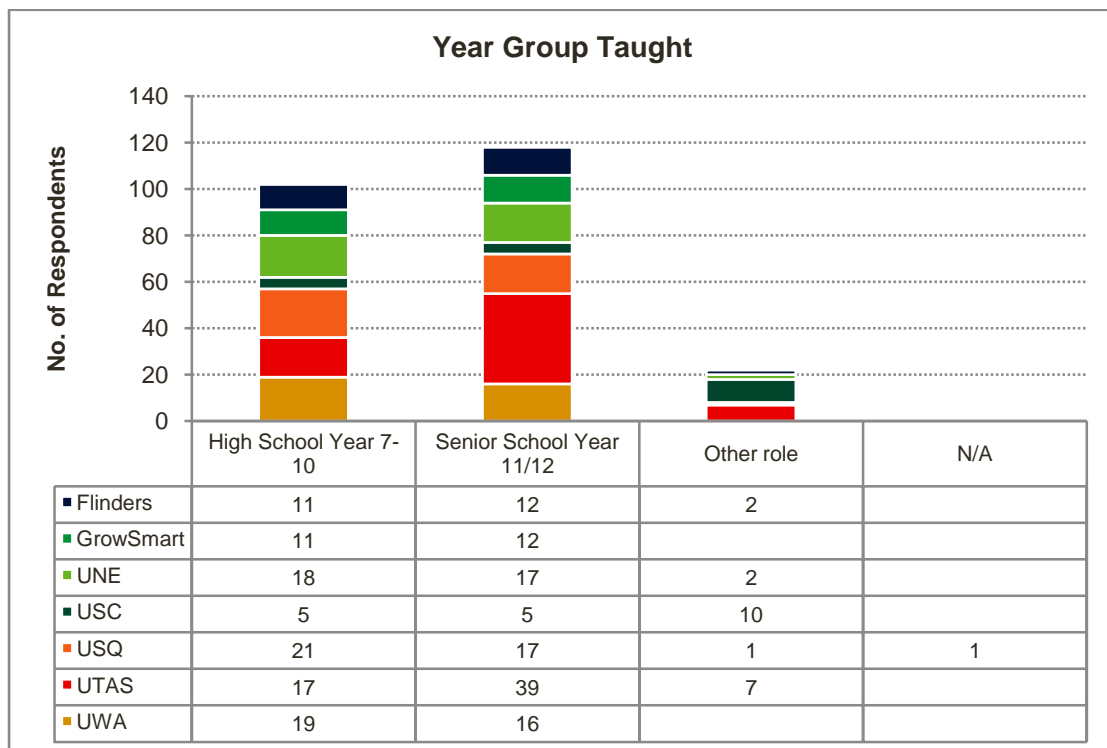


Chart 4: Science teachers' rating of perceived value of PICSE activities

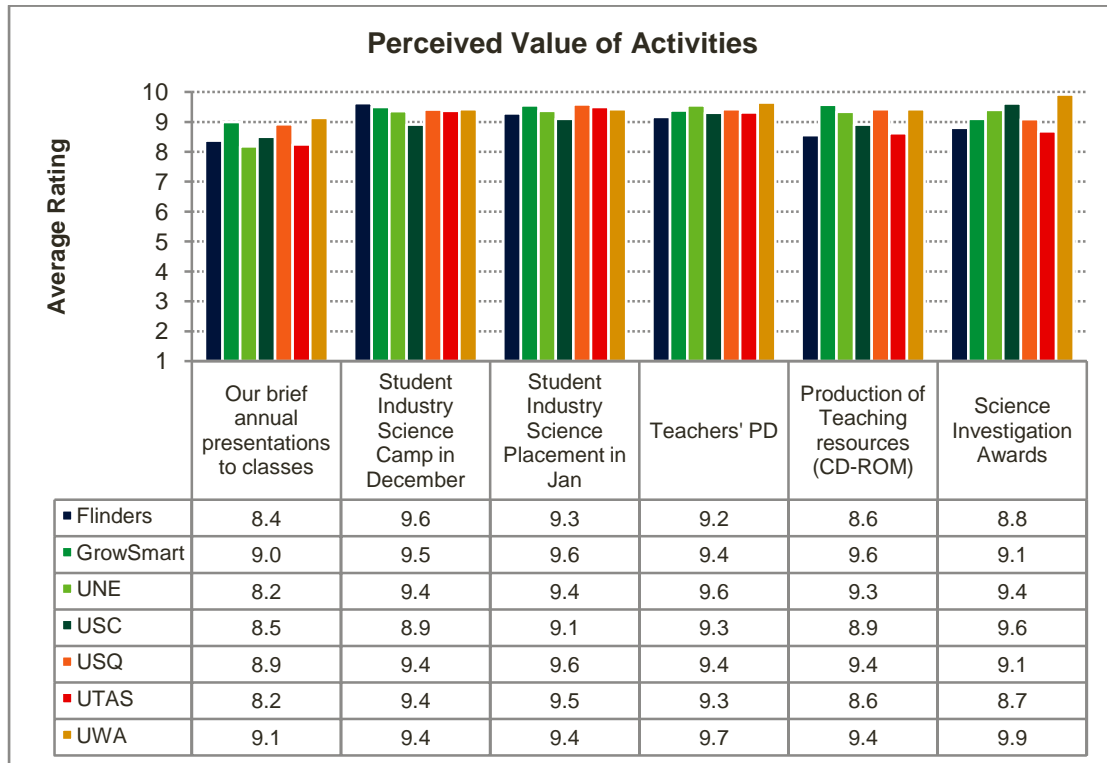
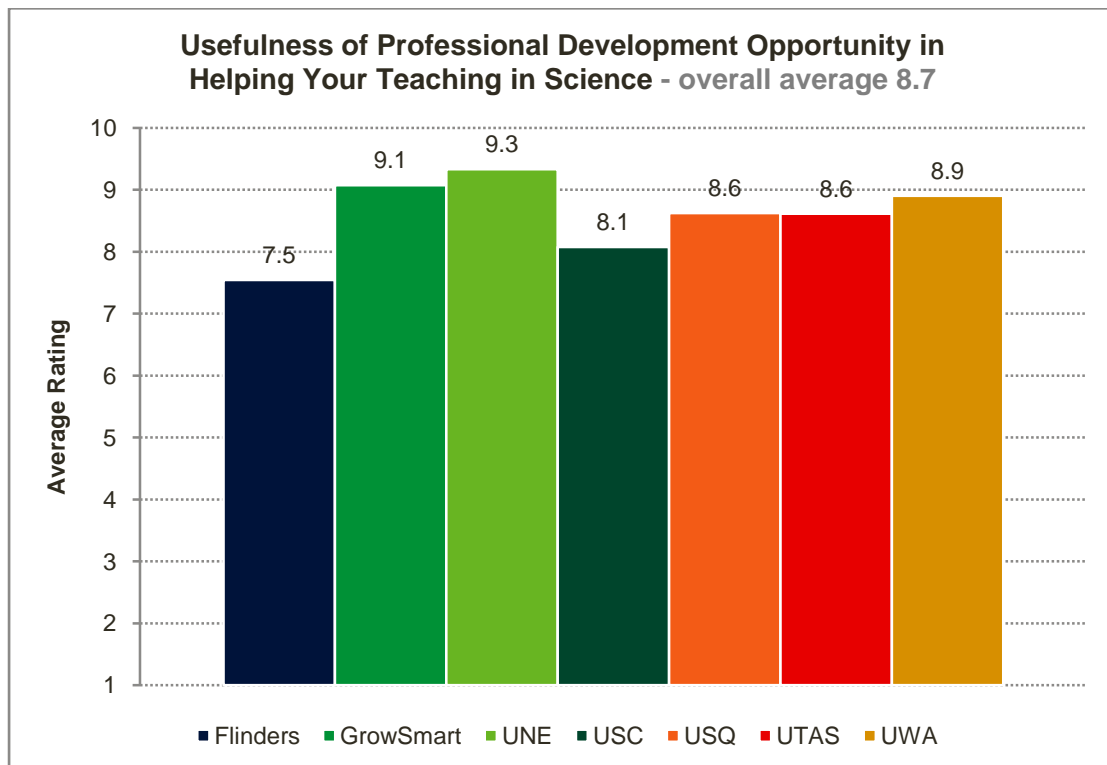


Chart 5: Science teachers' rating of the usefulness of PD in helping teach science



There were fourteen respondents who specified 'Other' areas where the PD was relevant to next year's curriculum. The most mentioned area of relevance was the ability to network and make new contacts who could provide 'specialist info' and 'enhance classroom implementation'. Also mentioned was the PD's ability to provide context, ideas, inspiration and a better understanding of covered areas.

Chart 6: Relevance of PD to Next Year's Curriculum

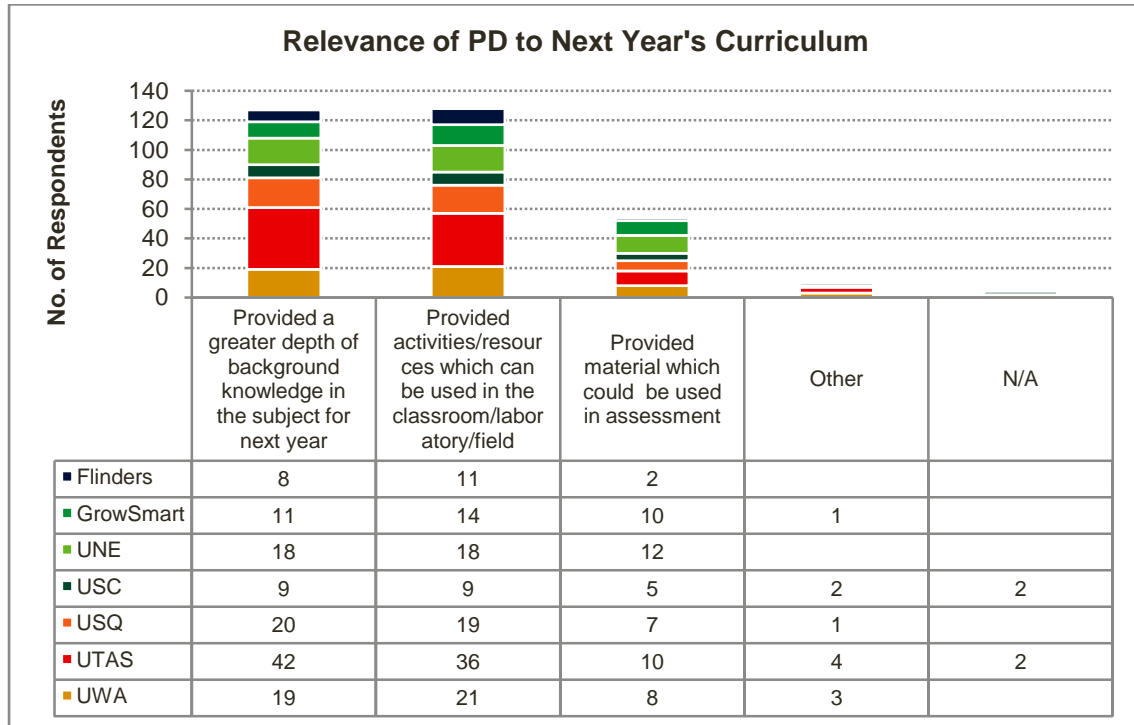


Chart 7: Impact of PD on teacher confidence, thinking and motivation

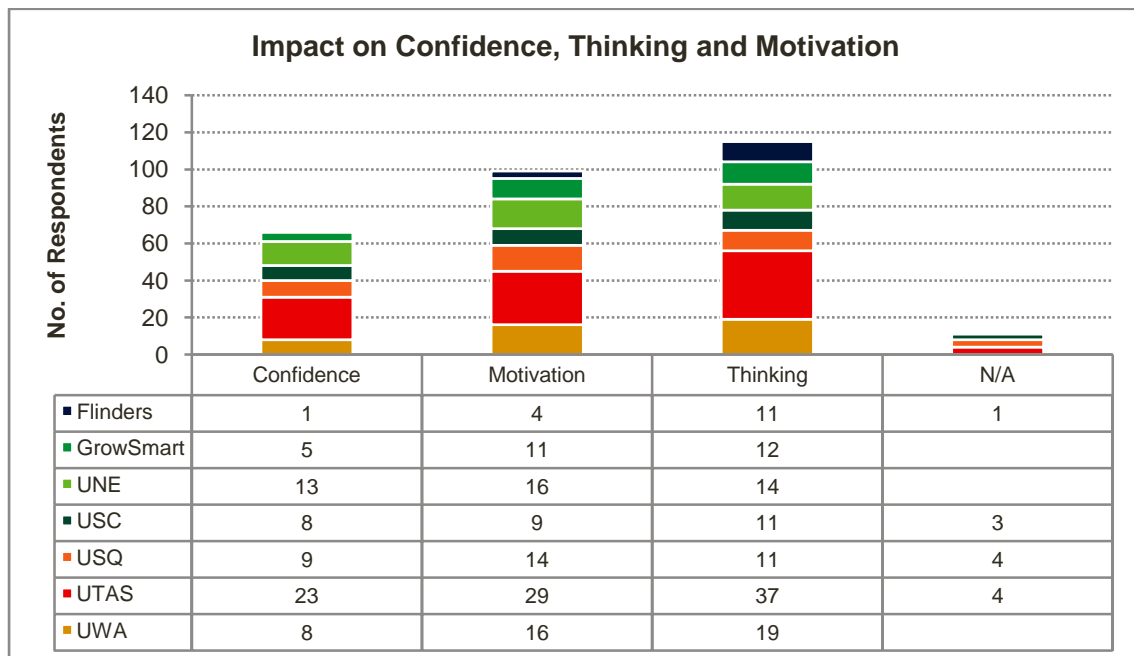
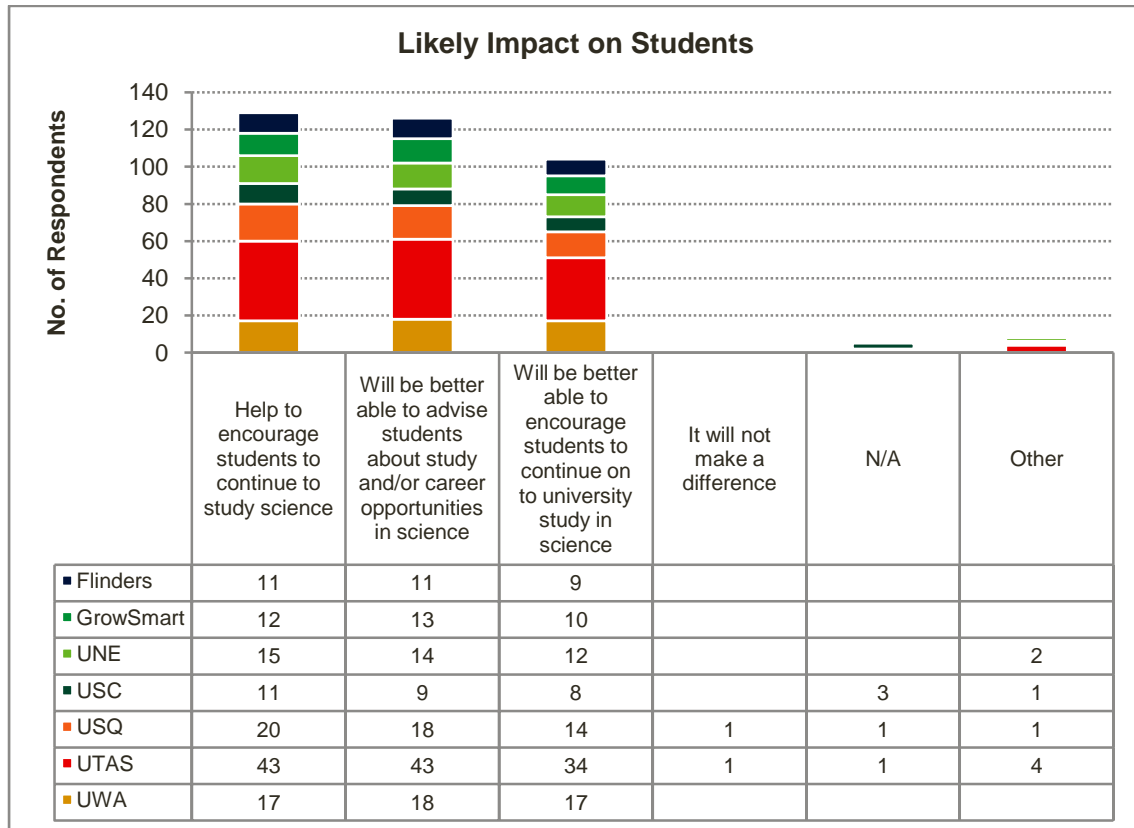


Chart 8: Likely impact of PD on students



When providing details on ‘Other’ likely impacts the PD would have on students, respondents commented that they would be able to better advise and encourage students and provide them with a better understanding and increased awareness of current scientific research. Respondents from **UTAS** specifically mentioned they could make science more relevant to students with Tasmanian examples. There were also comments from an **UTAS** and **USQ** respondent that they would now be able to better mentor and cater to teachers needs. A **Flinders** respondent indicated they could now ‘send students to open days’, while a **GrowSmart** respondent mentioned getting ‘more involved in the Science Investigation Awards’.

Appendix 2: SIA overall data 2010

Chart 9: Education level of participating students

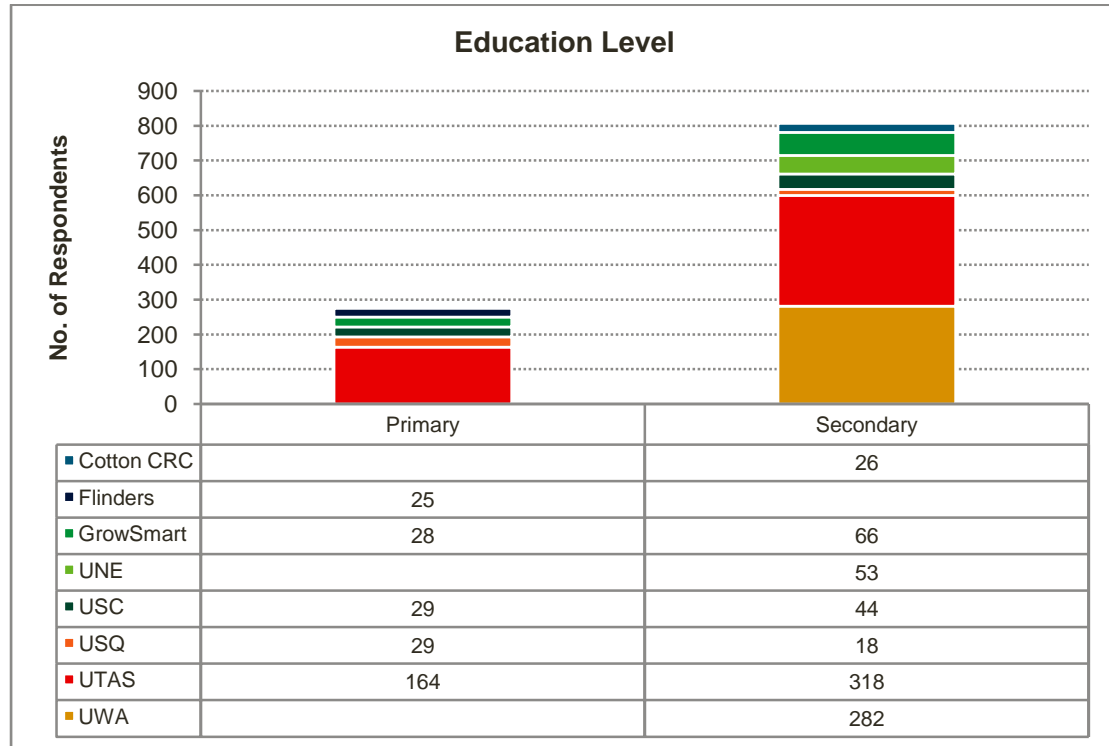


Chart 10: Gender of participating students

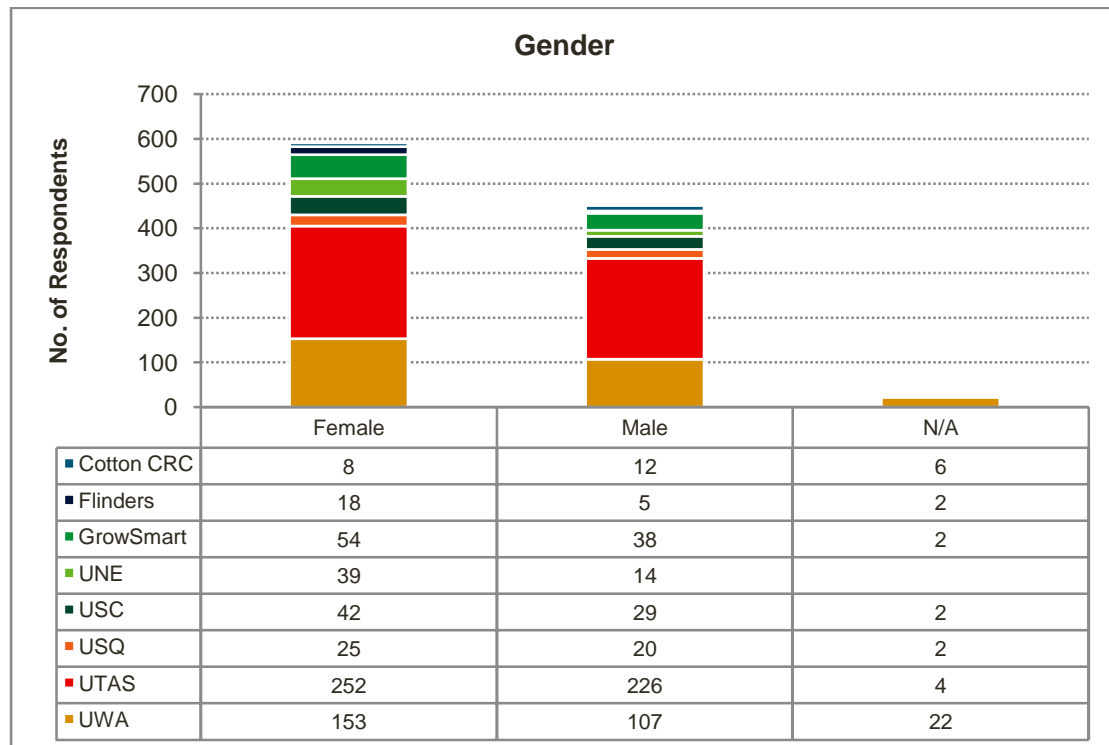


Chart 11: Rating of students' enjoyment of program

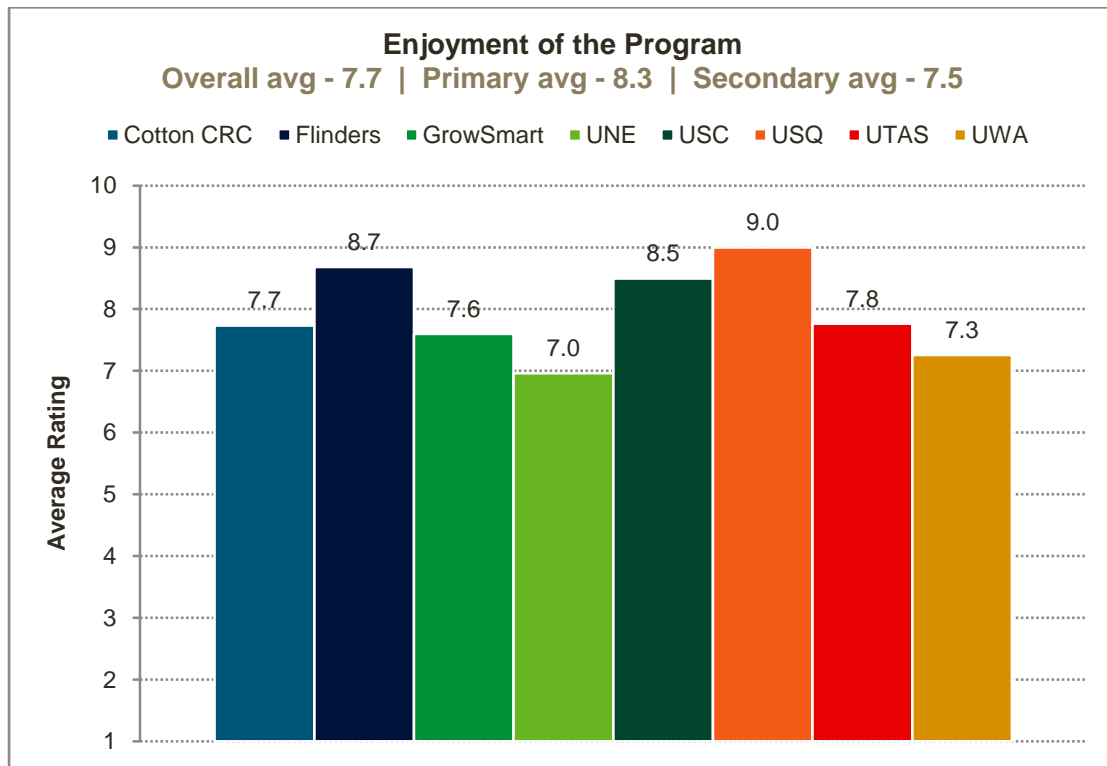


Chart 12: Impact of the SIA on other areas of students' schoolwork (primary and secondary)

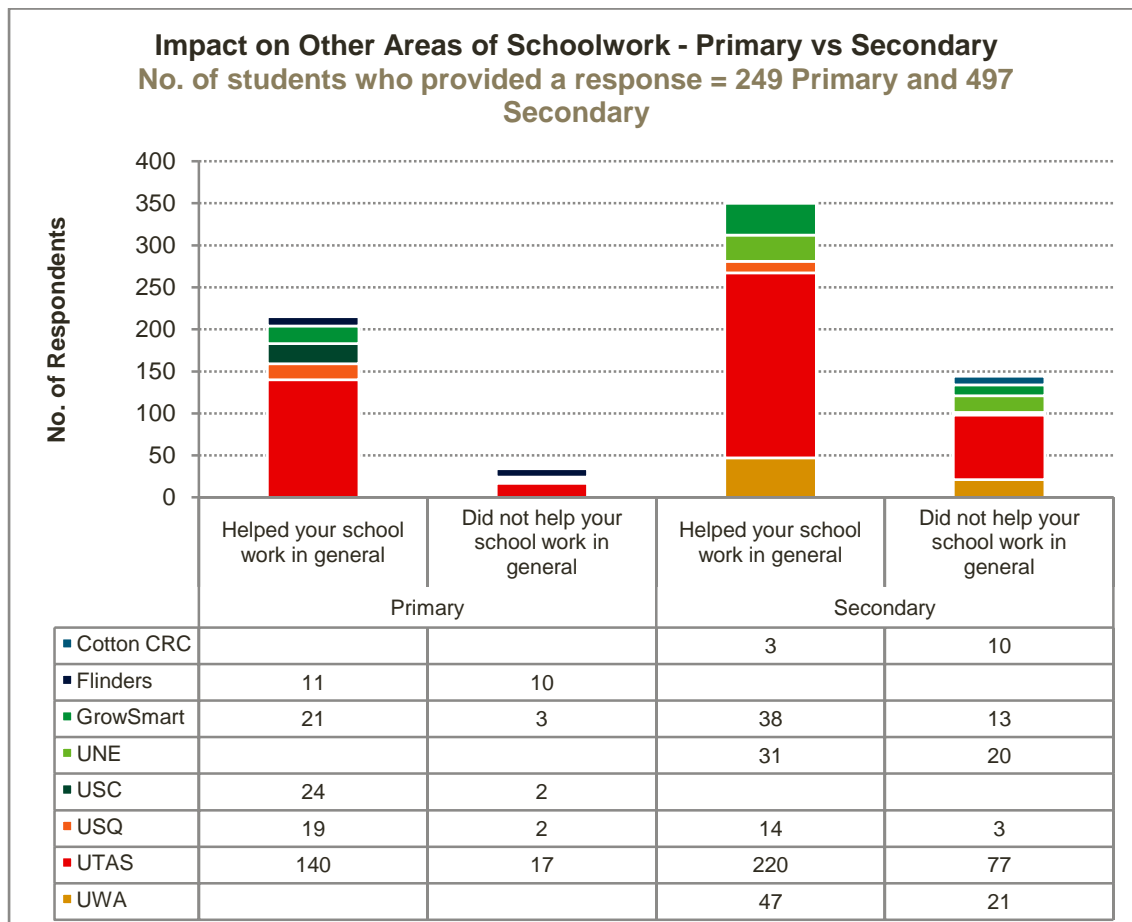


Chart 13: Secondary student rating of the impact of their involvement on their views of science and science studies

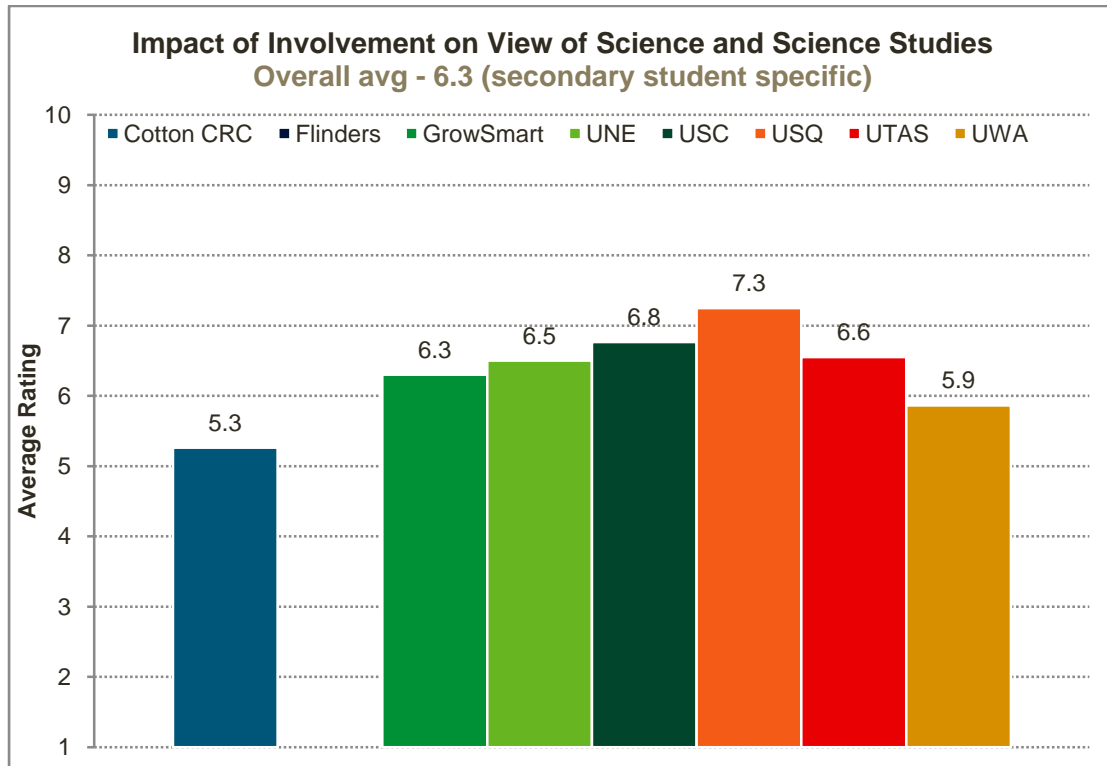


Chart 14: Impact on secondary students' interest in studying/seeking a career in science, primary industries or the environment

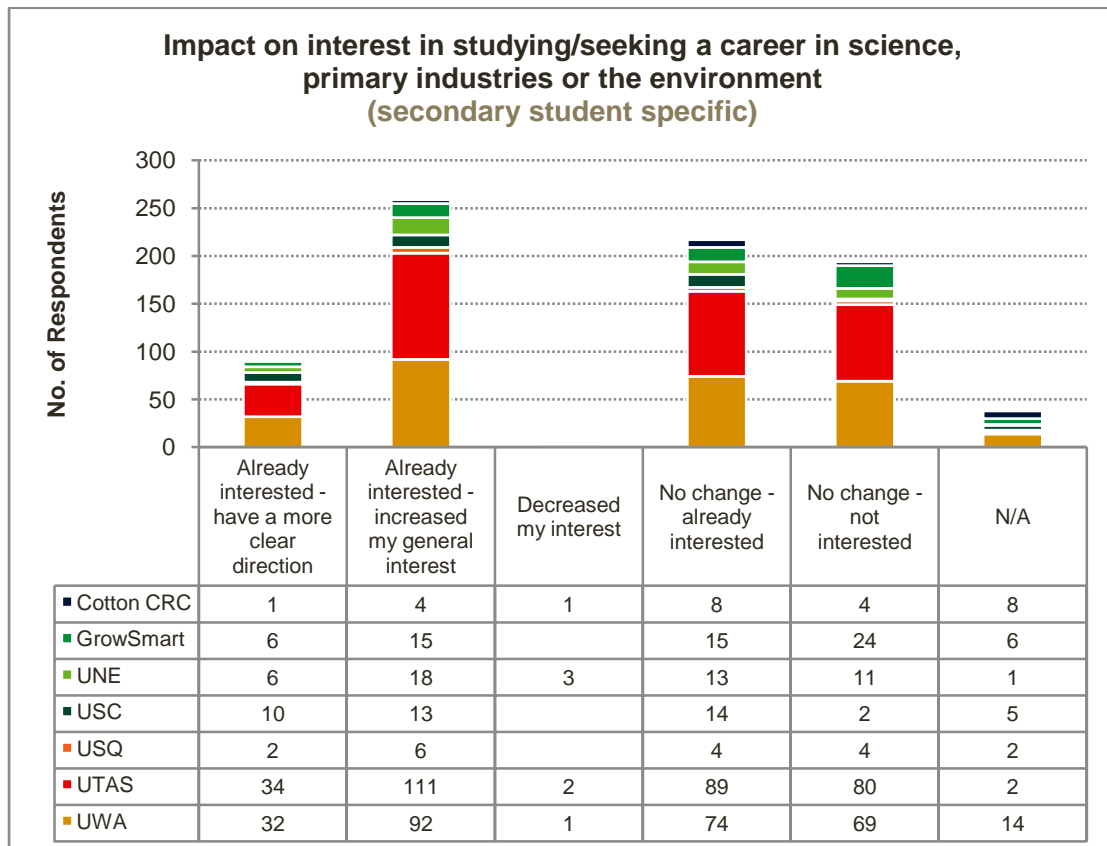


Chart 15: Primary and secondary student interest in participating in next year's SIA

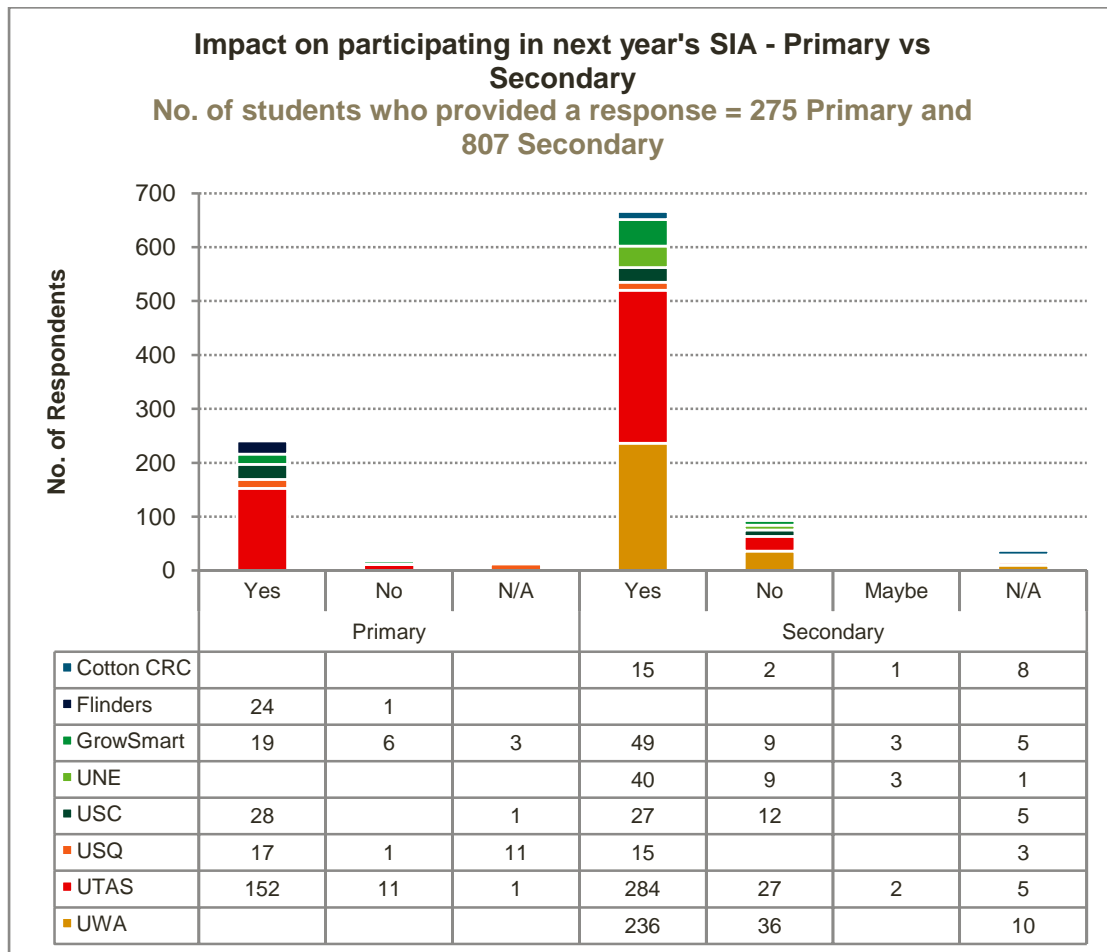
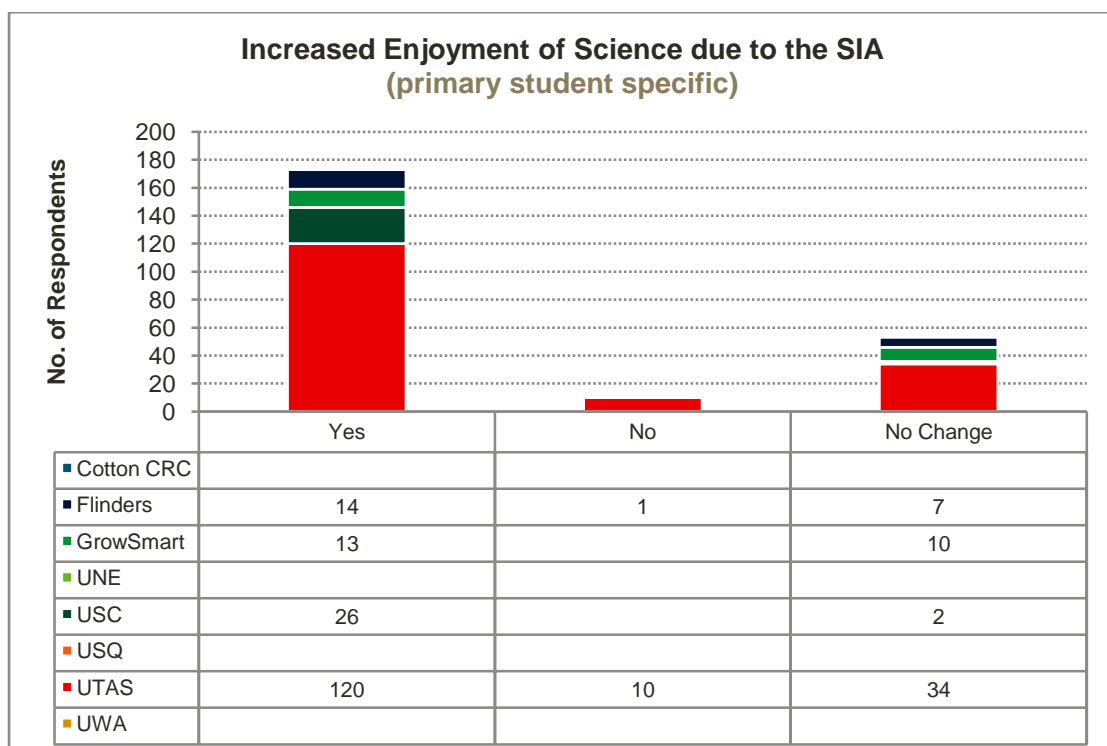


Chart 16: Primary student indication of increased enjoyment of science due to SIA



Appendix 3: IPS camp overall data 2010

Chart 17: Grade of IPS camp participants

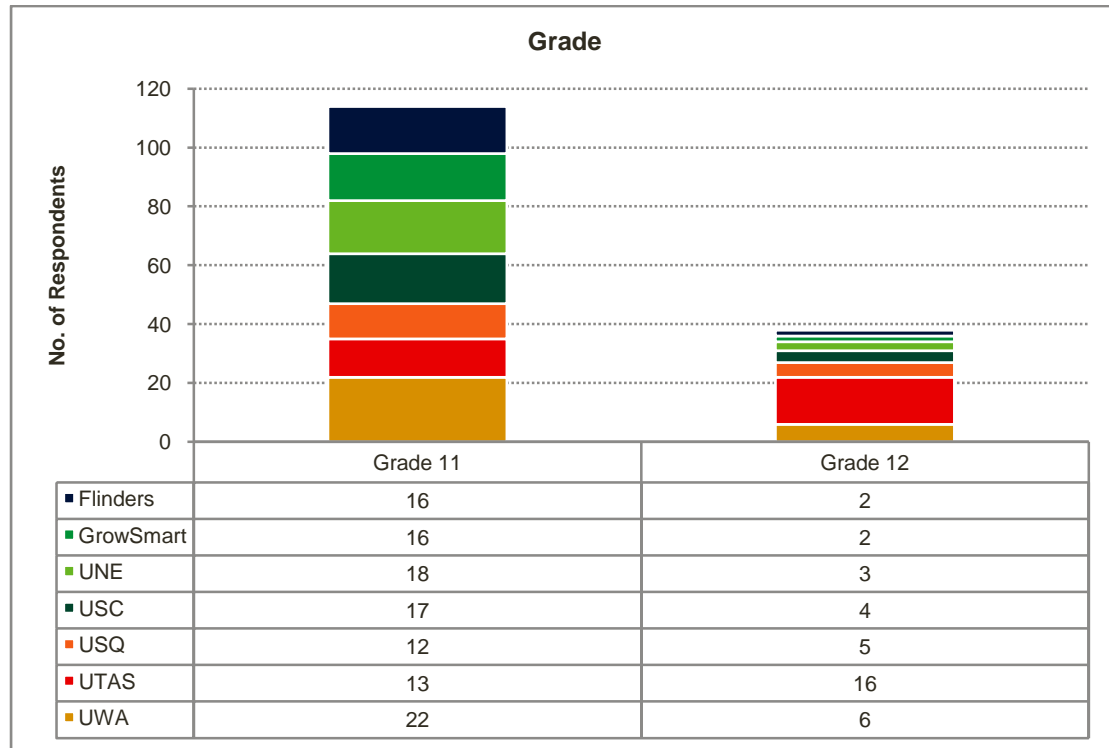


Chart 18: Gender of IPS camp participants

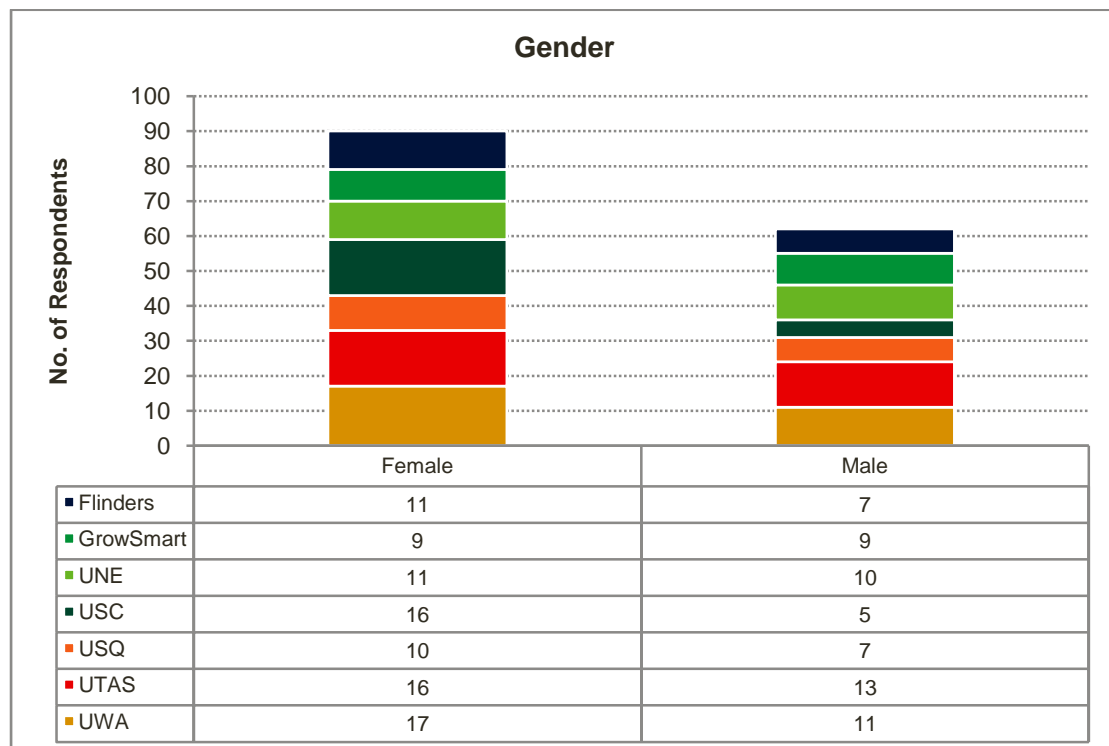


Chart 19: Participants' change in attitude towards studying science at university

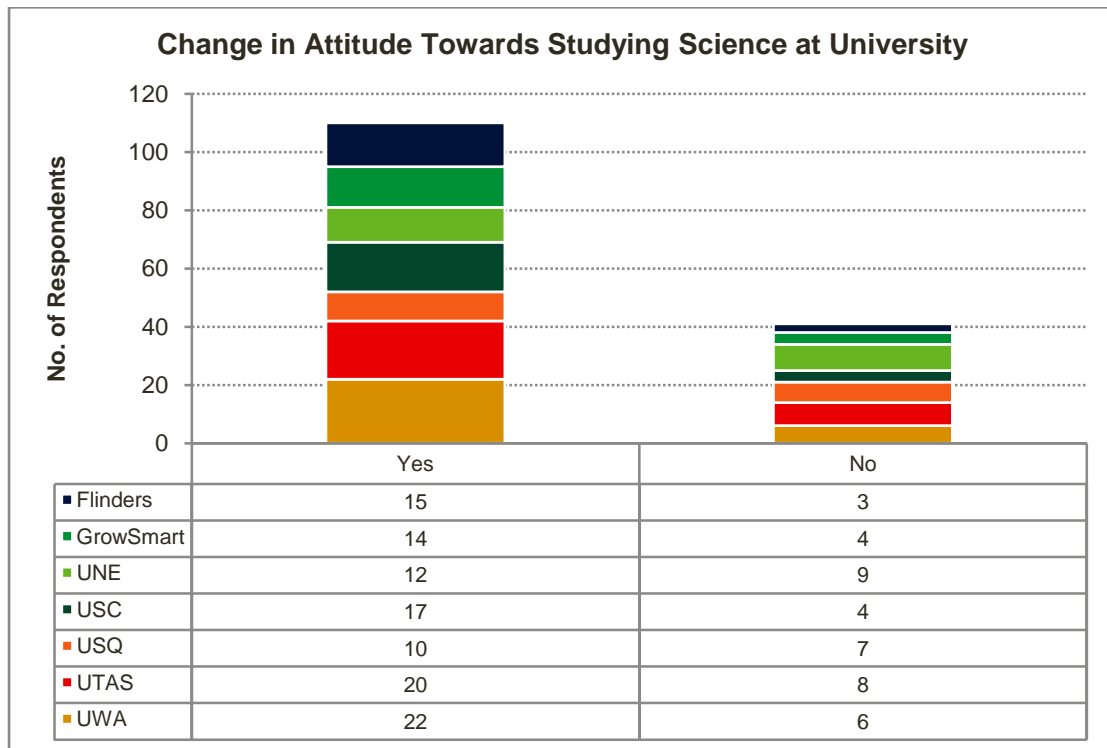


Chart 20: Interest in Postgraduate Study – before and after the camp

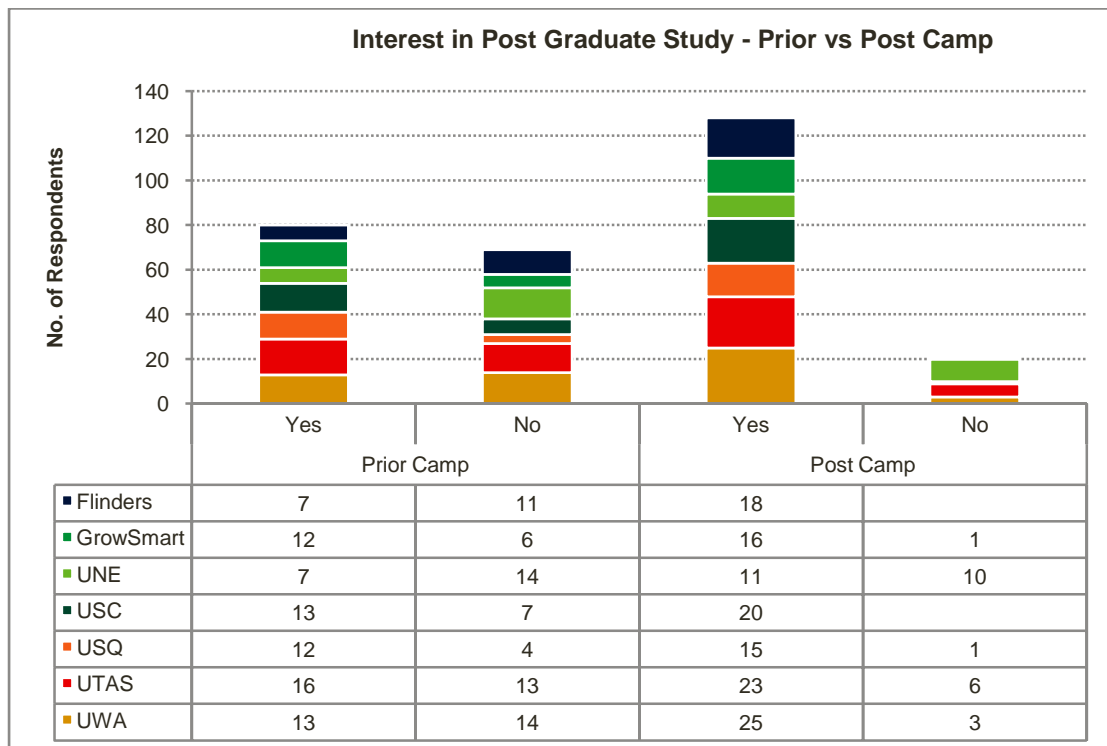


Chart 21: Intention to apply for particular courses (year II)

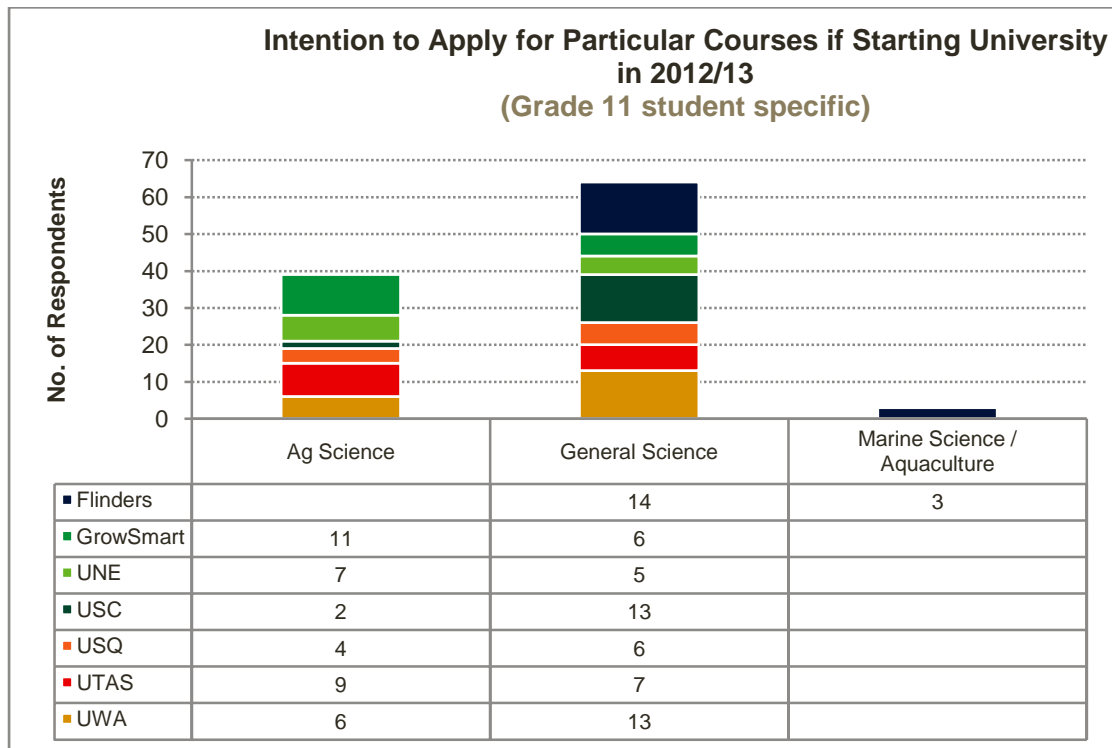
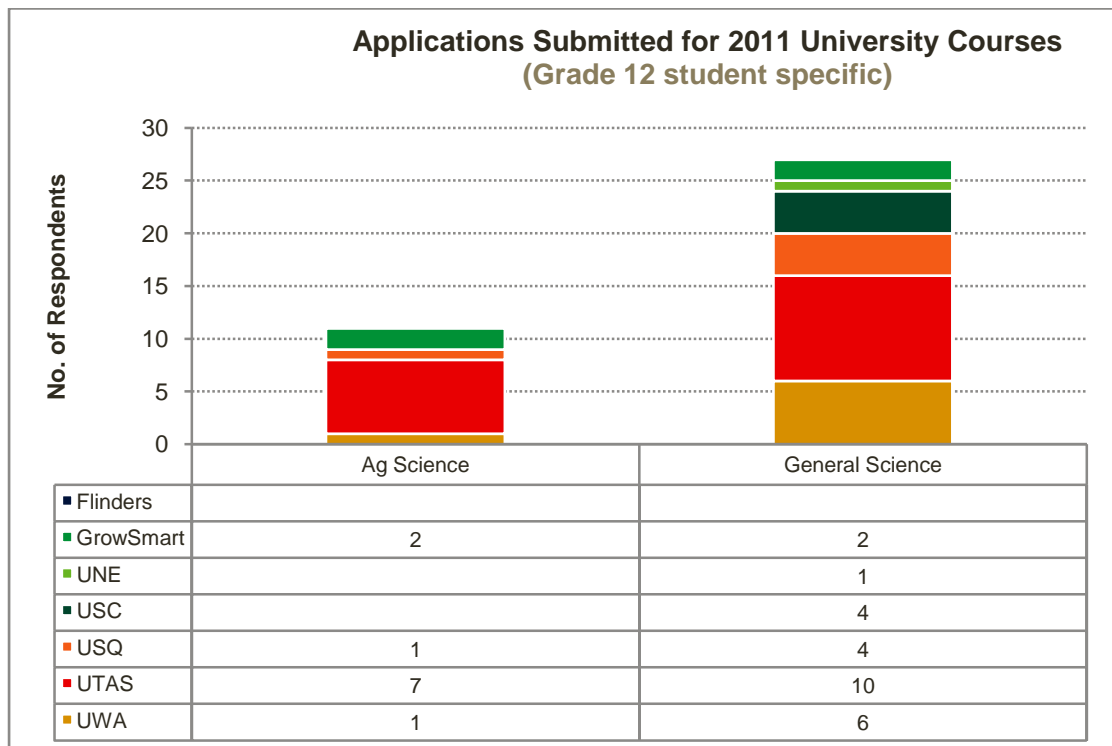


Chart 22: Application submitted for 2011 by year 12 students



Appendix 4: Year 10 camp overall data 2010

Chart 23: Gender of year 10 camp participants

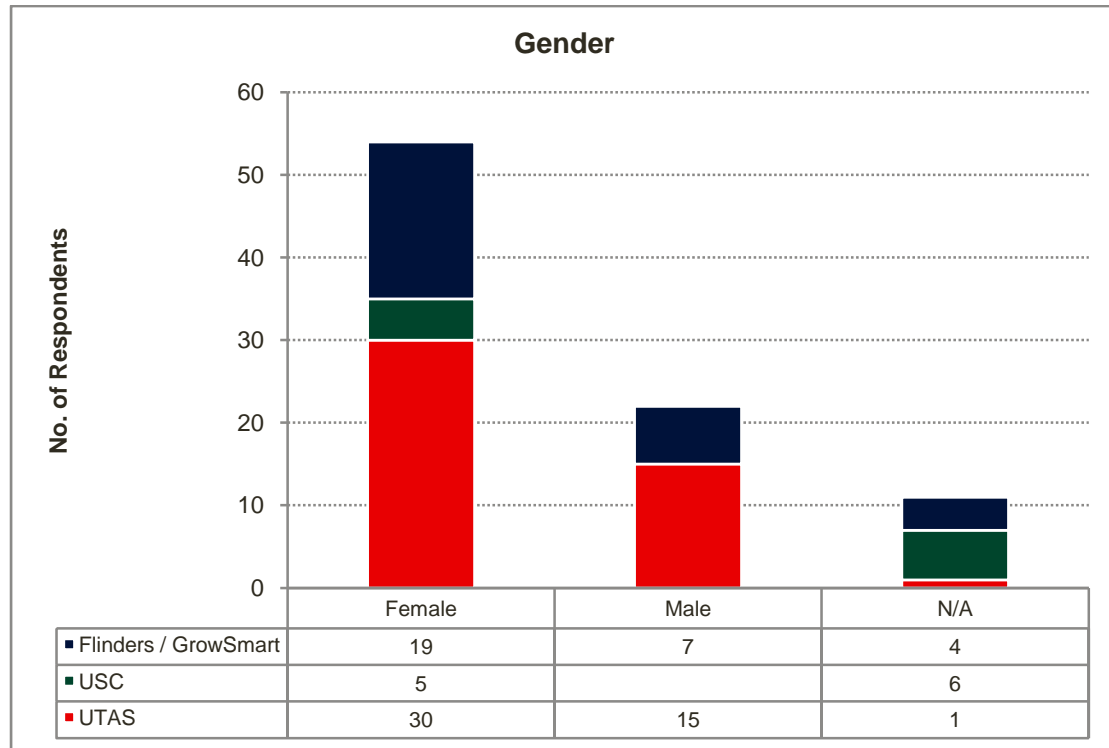


Chart 24: Impact on year 10 camp participant interest in studying science at school

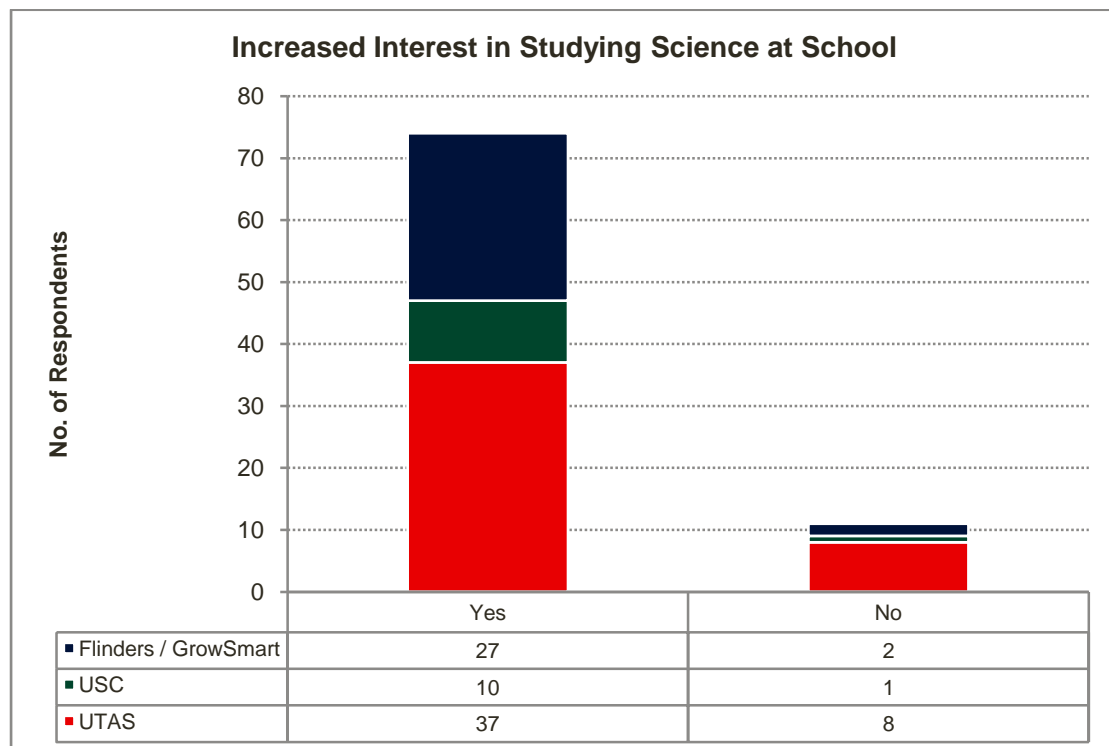


Chart 25: Impact on year 10 camp participant attitude towards careers in primary industries

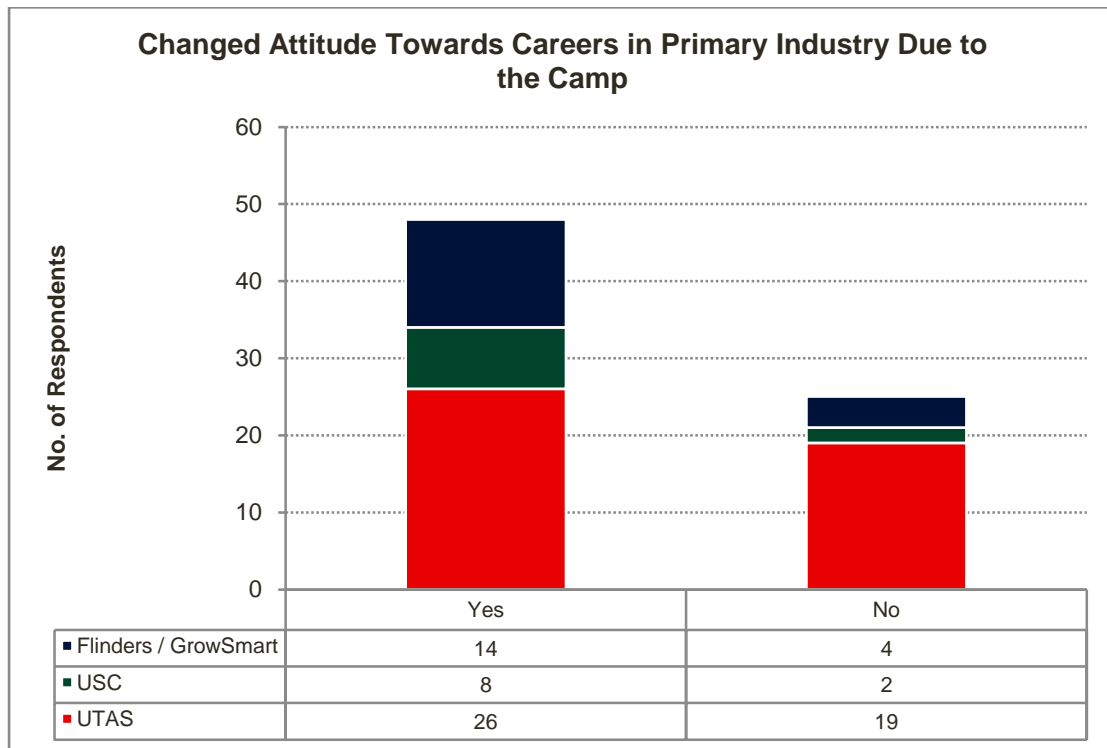
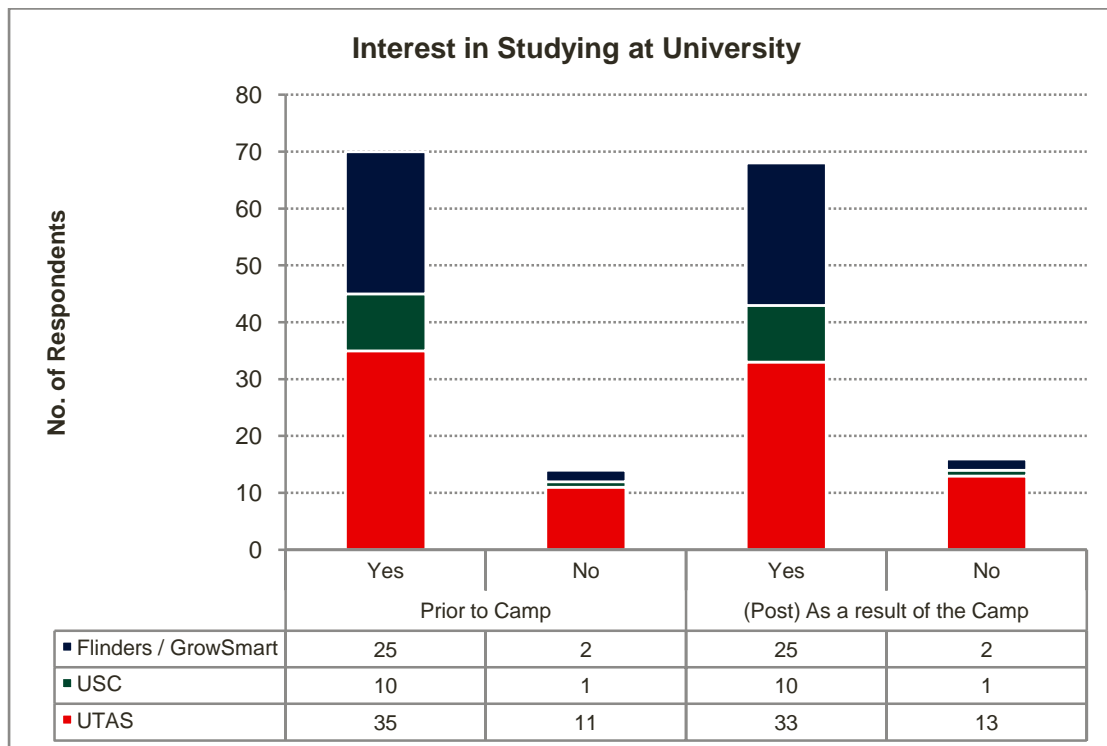


Chart 26: Year 10 camp participant interest in university studies



Appendix 5: Industry Placement Scholarships (2010) overall data 2010

Chart 27: Grade of students participating in IPS

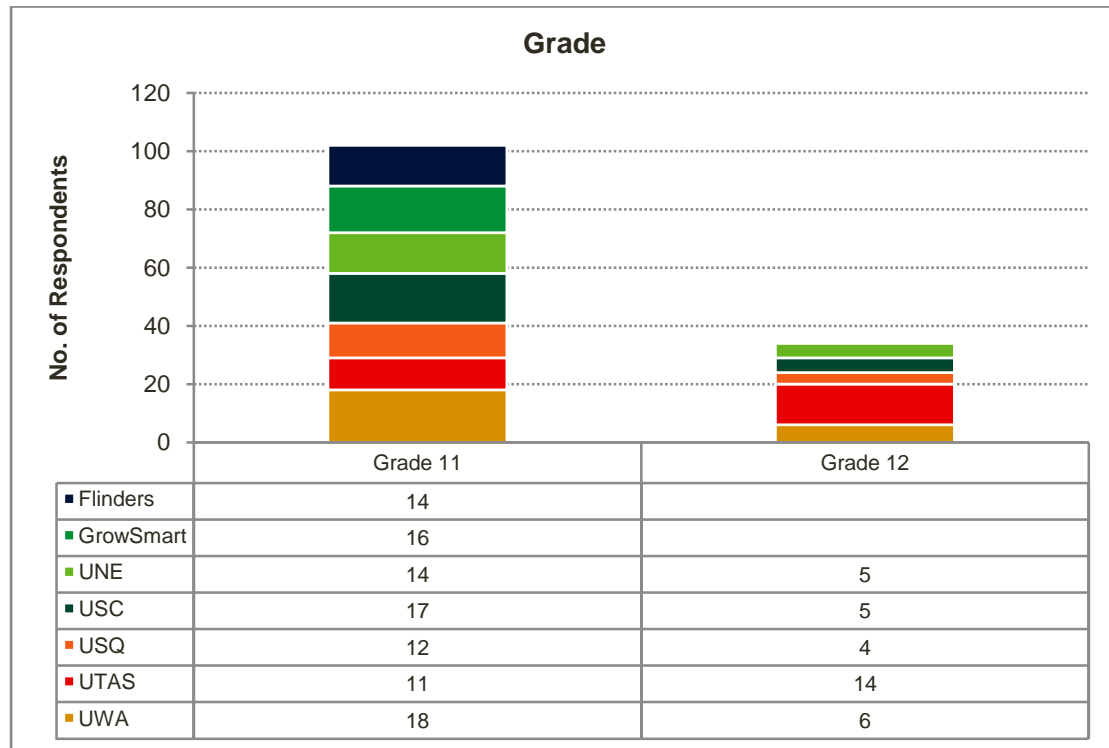


Chart 28: Gender of students participating in IPS

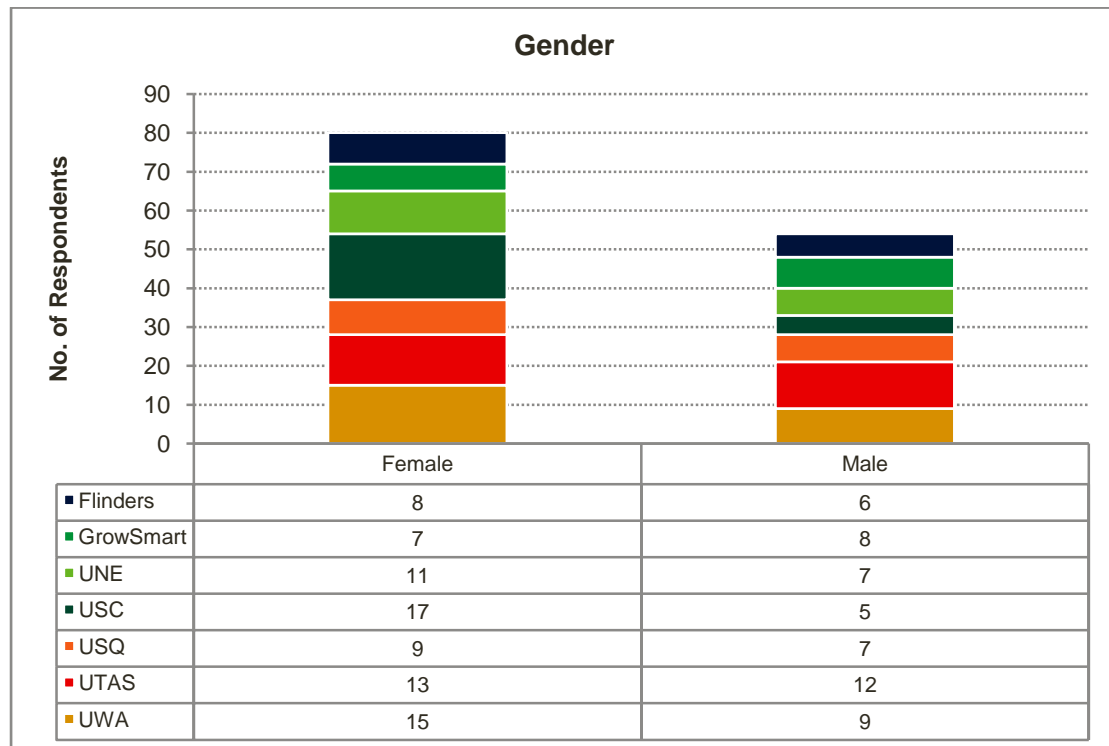


Chart 30: Change of students' view on the importance of science in primary industries due to IPS

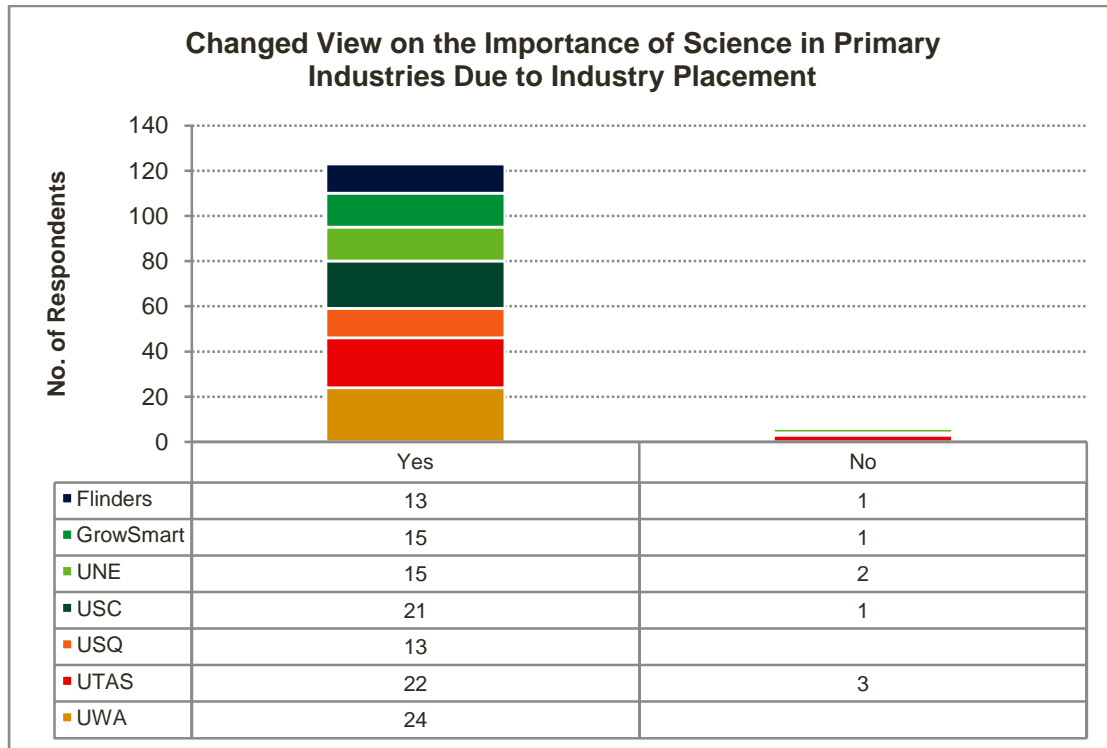


Chart 31: Impact on students' interest in studying/seeking a career in science or primary industries

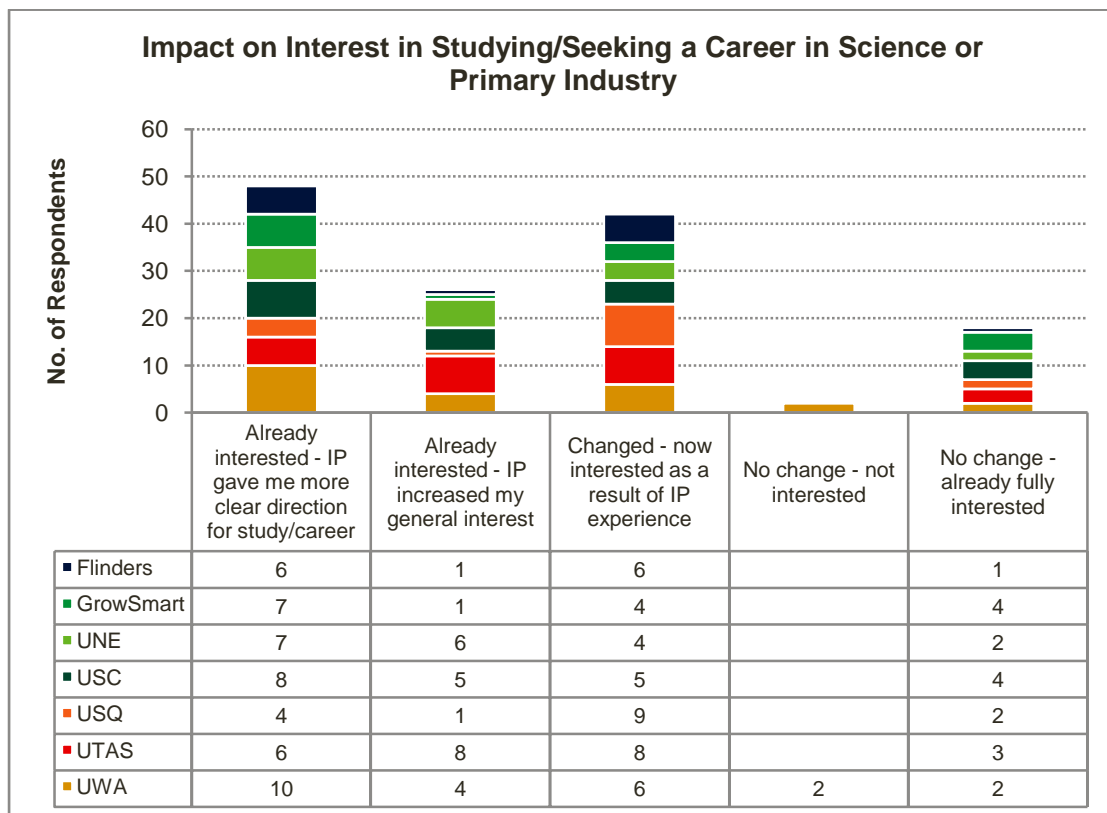


Chart 32: Students enrolled or intending to enrol in a course related to science or primary industries

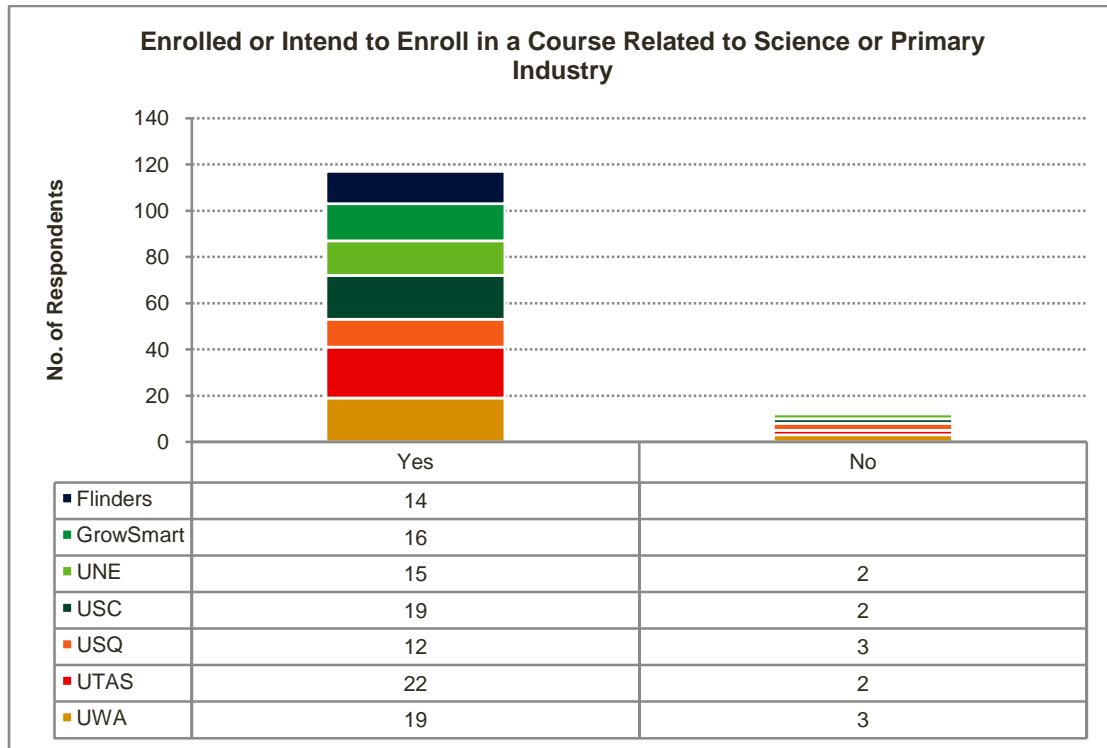


Chart 33: Change in interest in postgraduate study as a result of IPS

