



A Preliminary Evaluation of the STAWA Online Science Competition, SCIENCEiQ

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SUMMARY

The following page extracts from the report are provided as summary of the full report:

INTRODUCTION AND RATIONALE	3
CONCLUSIONS	24
Research question 1	25
Research question 2	25
Research question 3	25
Research question 4	26
Other outcomes and issues	26

INTRODUCTION AND RATIONALE

SCIENCE iQ is a series of online science competitions (<http://www.scienceiq.net>) for students in Years 5 to 10 conducted by the Science Teachers' Association of Western Australia (STAWA). The competition comprises 15 (predominantly) multiple choice questions, which are completed online by teams of four students in a 60-minute period. Students compete against students from the same year group. Teams of students participate in two rounds of quiz questions a week apart and their scores are added together to give a final result. The winning teams are those that achieve the most correct answers in the shortest amount of time.

The aim of the SCIENCE iQ quiz program is to promote science through providing an opportunity for students to work collaboratively to solve science-based problems. In answering the quiz questions, students are required to seek out information from textbooks, the Internet and other resources. It is hoped that students who participate in the SCIENCE iQ quiz will recognise the value of working collaboratively and develop a positive attitude to science.

Since its inception in Term 4 2007, there have been five rounds of SCIENCE iQ with over 1300 teams (from 86 different schools) participating in the quiz. Table 1 provides a breakdown of the number of schools and number of teams from each year level competing in the SCIENCE iQ quiz from Term 4 2007 to Term 4 2008. The shaded areas indicate that there was no SCIENCE iQ quiz for students to participate in from that year level during that term.

Table 1. Number of schools and teams competing in the SCIENCE iQ quiz each term

Term/ year	No. of schools	No. of teams						Total
		Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
4/07	12		34	36	31		101	
1/08	9		19	9	12		40	
2/08	36	74	48	49		33	235	
3/08	68	83	69	134		200	549	
4/08	61	84	78	78	152		392	

Since Term 4 2007 there has been a rapid increase in the number of teams in years 6, 7, 8, 9 and 10 participating. The number of Year 5 teams has remained constant.

The purpose of the research in this report is to provide a preliminary evaluation of the SCIENCE iQ online competition by addressing the following:

- Provide useful advice to science teachers on approaches and strategies to enable student teams to be successful in the SCIENCE iQ quiz;
- Raise awareness of how participation in the SCIENCE iQ quiz might influence students' approaches to other science assessments;
- Develop an understanding of the influence of the SCIENCE iQ quiz on students' attitudes to science; and
- Enable the development of SCIENCE iQ quiz questions that are appropriate for different year levels and target key concepts for each year group according to national curriculum documents.

This research study was informed by the following research questions.

- 1 What approaches or strategies are used by teams who have participated successfully in the SCIENCE iQ quiz?
- 2 Does participation in the SCIENCE iQ quiz have any impact on students' approaches to assessment in science?
- 3 Does participation in the SCIENCE iQ quiz have any impact on students' attitude to science?
- 4 To what extent does the content of the SCIENCE iQ quiz align with national science standards in Australia, the United states and the United Kingdom?

CONCLUSION

The purpose of this research was to:

- determine the approaches and strategies used by teams of students to successfully answer the quiz questions;
- determine the impact of the SCIENCE iQ quiz on students approaches to assessments in science;
- determine the impact of the SCIENCE iQ quiz on students' attitudes to science; and
- determine the extent to which the SCIENCE iQ quiz questions aligned with national curriculum documents from Australia, the United States and the United Kingdom.

Nine teachers and 51 students from years 5, 6, 7, 8, 9 and 10 were interviewed. The 51 students were from both place and non-place teams.

Research Question 1

What approaches or strategies are used by teams who have participated successfully in the SCIENCE iQ quiz?

There were several clearly identified strategies and approaches used by successful teams. The generic skill is also indicated. They were:

- allocate roles within the group especially those of organiser and researcher(s) (Co-operative group work skills)
- delegate questions to members of the team or sub groups of two (Co-operative group work skills)
- solve disagreements about answers by searching for more evidence (Problem solving skills)
- research the question even if sure of the answer (Research skills)
- use the Internet as it is faster than using books (Problem solving and Research skills)
- use multiple computers (Computer skills)

Research Question 2

Does participation in the SCIENCE iQ quiz have any impact on students' approaches to assessment in science?

The SCIENCE iQ quiz did not change secondary school students' approaches to assessment in science because their assessments are predominantly individual and test based in contrast to the quiz which is collaborative and research based.

In contrast, primary school teams and their teachers perceived that participation in the SCIENCE iQ quiz improved their students' motivation, confidence, problem solving and research skills. It also reinforced the importance of reading questions carefully and checking answers. The quiz also provided an opportunity to practise answering multiple choice questions.

Research Question 3

Does participation in the SCIENCE iQ quiz have any impact on students' attitude to science?

All students, primary and secondary, place and non-place displayed a positive attitude to science and the quiz. Overall, the average score out of 10 for attitude towards science was 8.5 for place students and 8.2 for non-place students suggesting that all students enjoyed science regardless of whether they were in place or non-place teams. The quiz did not seem to impact positively or negatively on these students' already positive attitudes. However, participation in the quiz did increase some students' science knowledge, confidence, motivation, enthusiasm and sense of achievement.

Research Question 4

To what extent does the content of the SCIENCE iQ quiz align with national curriculum documents in Australia, the United states and the United Kingdom?

A large proportion (366/390, 94%) of the quiz questions had a clear content focus of biology, chemistry, physics or earth science. Across all year groups there are more questions on biology topics (36.6%) than the other three science areas of physics, chemistry and earth science. Questions about earth science are under represented (17.4%). It is recommended that more questions on physics and earth sciences be developed for all year groups.

About one quarter (24%) of the 390 quiz questions had a process focus. The questions were evenly distributed across the two process areas of investigating and science and society. The area of science and technology from the US national science education standards was under represented in the quiz. In addition, there were no questions on critical understanding of evidence from the UK national curriculum. If the SCIENCE iQ quiz is to be promoted in the UK and US it is recommended that questions related to these two areas be developed.

Other outcomes and issues

It appears that participation in the SCIENCE iQ quiz increases students' co-operative learning or team work skills. Participation also seems to increase students' science knowledge and broaden their views of what science is.

Other issues raised in the teacher and student interviews relates to cost, computer and Internet access, prizes, feedback on correct and incorrect answers and provision of an overview to encourage preparation.