



The ADAPT All Ireland Linguistics Olympiad (AILO)

A Case Study

The All Ireland Linguistics Olympiad (AILO) is a key component of the ADAPT EPE Education strand for second level students. The Education strand aims to foster skills necessary for citizens and students to engage effectively in our increasingly digital world and to drive future developments in this rapidly-changing field. AILO is the Problem Solvers' Challenge and the national contest sees secondary school students develop their own strategies for solving complex problems in unfamiliar languages from around the globe.

Project Partners

Funding: Science Foundation Ireland, small project funding from the Department of Heritage, Culture and the Gaeltacht.

Background (150 words)

Over 22,500 secondary school students have taken part in AILO since its launch by ADAPT in 2008/9. AILO is a key component of the ADAPT Education Programme for Second Level Students under Creative and Collaborative Problem-Solving. No prior knowledge of linguistics or foreign languages is required. Even the hardest problems require only logical ability, patient work and a willingness to think around corners. AILO introduces students to the application of logic and linguistics to problems of language understanding and translation. The goals are to develop students' problem-solving skills and to inspire them to consider the fascinating range of careers at the intersection of computing, language and linguistics. Target audiences for AILO include school with "DEIS" disadvantaged status as well as schools in the eight SFI-noted counties which have low STEM engagement.

AILO is an All-Ireland competition and has sent a team of four students to the International Linguistics Olympiad (IOL) since 2008. Despite core funding for the Republic only, AILO has always been actively promoted in Northern Ireland and we have had at least one student from the North qualifying for the international team each year.

ADAPT hosted the IOL in Dublin in 2017 as part of the Problem-Solving Initiative which saw teams from 30 countries come to Dublin for a week of individual and team competition. Hosting the IOL helped to raise awareness nationally of the importance of problem solving skills to STEM, to industry and to society.

Purpose (150 words)

ADAPT has identified 'collaborative and creative problem-solving' as a key skillset to leverage digital media innovations and to enhance how we interact with future digital media and information. Collaborative and creative problem-solving underpins not just future digital engagement, but also the core disciplines of ADAPT research itself, which include computer science, language technology, engineering, artificial intelligence, human-computer interaction, and machine learning. ADAPT's education strand on collaborative and creative problem solving, builds capacity in this fundamental skill, but also directly complements ADAPT's core vision.

The aims of AILO are to improve students' problem-solving skills as well as their confidence in their problem-solving ability. By focusing on these key skills, students will engage more effectively in our increasingly digital world and be in a position to drive future developments in this rapidly-changing field.



AILO was selected as the core element of the collaborative and creative problem-solving initiative at second level due to evaluation of earlier seasons of the contest, which showed that participants reported enhanced problem-solving and lateral-thinking skills and an increased propensity to consider careers in Computing, Linguistics or Language at Third Level.

Approach (150 words)

The goals and expected learning outcomes for students taking part in each round of AILO were set out showing the clear links with the Irish Junior Certificate (JC) curriculum key skills and statements of learning (SoL) as well as the OECD PISA (2012/2015) problem solving competencies and evaluation / assessment techniques. An overview of whole programme is below:

Example of AILO Learning Outcomes linked to Junior Cert (JC) Curricula, JC Key Skills & Statements of Learning (SoL) and the PISA Problem Solving Competencies (2012/5)						
Students learn about	JC Key Skills	JC Coding	JC Maths	JC SoL	PISA	Students should be able to:
Developing a positive disposition towards investigating, reasoning and problem-solving	✓	✓	✓	SoL 15	✓	1 Discuss the importance of problem-solving skills as a key component in a STEM career.
Seeing patterns and trends in complex logic puzzles in unfamiliar languages	✓		✓	SoL 2, 15, 16	✓	2 Complete logic & AILO puzzles
Problem solving strategies for each of the 6 types of AILO puzzle	✓		✓	SoL 17	✓	3 Recognise features that will make a language rule.
Gathering, interpreting and representing data	✓	✓	✓	SoL 17	✓	4 Understand when and how to use tables and charts to decipher data for each problem type (number systems, semantics, writing systems, phonetics, syntax, morphology.)
Expressing ideas clearly and accurately	✓	✓	✓	SoL 1,18	✓	5 Describe the observations they made about the language with concise and complete rules.
Collaborative problem-solving techniques (Round 2, IOL)			✓		✓	6 Monitor and reflect on their learning
						7 Work as a team and reflect on their role in the team (Round 2, IOL)

Schools who register in September in a given year, receive monthly sample puzzles Sept-Jan. Workshop content is designed, developed and formatively evaluated in October. Approximately 19 ADAPT tutors, along with former international-level students are trained to deliver the workshop. Over 30 workshops are planned around the island in November and December 2018. Students take the preliminary round in their own schools at the end of January. The National Final takes place in March in an ADAPT location in Dublin and consists of individual and team rounds.

Evaluation (150 words)

The 2017/8 evaluations showed that secondary school students taking part in the AILO National Final reported a 67% improvement in their perceived strategies for solving complex problems. The workshops impacted students with a 22% increase in secondary school students considering studying computing, languages or linguistics at University post-PSI engagement. Over the past two years, 44 ADAPT tutors were trained to deliver the 56 problem solving workshops involving 1463 students from over 50 schools in 23 counties. Importantly, in 2017, nine schools from seven of the eight counties highlighted as having low levels of STEM engagement hosted workshops. 13% of AILO 2017/8 registrants were from DEIS schools, which was an increase of 4% since 2016.



Lessons Learned

While evaluations have been carried out each year, a new framework is in place for 2018/9. For the Participation Round (Sept-Dec) in 2018, the puzzle pack downloads are being tracked and a questionnaire asks about intended use. A teacher survey in December will ask teachers about actual use and their interest in a longitudinal study. The workshops, the preliminary round and the National Final have ongoing pre- and post-engagement surveys tracking confidence in problem-solving ability and interest in STEM-uptake in University. As well as the student-sentiment questionnaires, an analysis of student performance in round two of AILO and IOL 2017 was carried out in 2018 to assess student ability to solve complex problems. The analysis indicated that AILO students were able to see patterns and trends in complex puzzles, but improvement was needed in representing those ideas clearly and accurately.

These results led to new content for the 2018 problem-solving workshop programme including breakthrough logic puzzles, strategies for solving complex problems and practical steps on analysing data and presenting findings. Students also now have access online to all previous workshops, examples and previous years papers.

In 2019, student problem-solving ability will also be tracked at the Preliminary Round. Students will have to complete practical steps to represent the data and describe the rules of the new language in the puzzle clearly and succinctly.

Legacy (150 words)

The AILO Problem Solving Olympiad is now the core elements of the secondary school ADAPT Education Programme with over 22,500 secondary students engaging with the programme to date. While AILO evaluation has consistently shown the number of students reporting their interest in taking STEM topics at University, a longitudinal study is being developed for teachers, students and parents to track student engagement and longer-term outcomes.

AILO has shown there is an appetite for problem-solving at secondary school and a match with AILO in terms of the Junior Certificate key skills and the Coding and Maths curricula. Improving these critical and necessary skill is important for their use in education and in the workforce of the future.

ADAPT DCU is now investigating the relaunch of the degree in Applied Computational Linguistics (ACL) due to the expertise in the Centre and the interest shown by over 4000 secondary school students every year in taking part in AILO.

ADAPT is also in the process of developing problem-solving skills at primary school level with an Ozobot robotics classroom workshop series targeted at 10-12 year olds. The 3-part workshop series is designed to foster students' interest in and excitement for problem solving from a young age, while also introducing them to coding and simple scientific concepts such as machine vision and human-computer interaction. Ozobots are small smart robots, which are programmable through drawn lines and colour codes. ADAPT piloted the first workshop in four primary schools in H1 2018 and is working with DCU Institute of Education to pilot the 3-part series in schools in H2 2018. This pilot will involve schools with official 'DEIS' disadvantaged status, as this is a priority demographic for SFI and ADAPT.