Franchise Proposal

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Disclaimer

Thank you for the opportunity to submit this non-binding (other than pricing for now available products listed in our quotes), proprietary and confidential proposal for your consideration.

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Executive Summary

EDRO was formed in early 2014 to address a gap in current education programmes for integrated STEAM (science, technology, engineering, art and math) curriculum using robotics. Countries all over the world including the US, UK, Europe, Australia and Asia use robotics in their classroom, some for many years. It is estimated that 20,000 robot kits are purchased annually for use in the South Korean educational system as an example.

Why robotics

Robotics inspires learners to make connections across STEAM disciplines rather than learning topics in isolation as it combines mechanical, electronic, electrical and programming skills. Robotics provides a fun, inspiring, but yet challenging method for kids to apply these concepts in a satisfying way. It also encourages critical reasoning, problem solving, creativity and team work. Numerous studies have shown that learners engaged in robotics go on to excel in learning mathematics, science and ICT and there is increased enrolment in further study in these fields.

Perhaps more importantly, robotics also introduces kids to a deeper understanding of how technology really works, preparing them for a future that will become increasingly technologically complex. The ability to code is cited as being the new literacy for the future and programming robots introduces learners and learners to computer programming and coding.

Traditional education practices are being challenged to change towards experiential learning away from passive learning, as engagement and active learning increases the pace of learning.
Many news reports and surveys rank the quality of South Africa's math and science education as one of the lowest in the world. EDRO's mission is to contribute towards addressing gaps in our STEAM education programmes.

There are some schools in South Africa who have introduced robotics as part of their in-school curriculum, but these are only a handful, usually the upper quintile schools and independent schools. Even in these schools it is often a passionate educator who has introduced robotics, who have formulated their own curriculum as an additional responsibility with great effort. There is no consistent robotics curriculum with common core learning objectives, no sustainability should that educator leave and move on, and very little collaboration amongst schools.

There are a few robotics clubs that offer children after school robotics programmes, all using different equipment and lessons, with no actual learning quality checks. We also find that it is often a certain type of learner who signs up for these programmes, and poorly attended by girls who tend to steer away from these types of activities. Some schools have even suspended their robotics programmes as they were not properly implemented. To address these challenges, EDRO has partnered with EdTech leaders in the USA and has developed a curriculum suited to the South African market.

EDRO's curriculum has proven success with many academies in Cape Town as well as holiday workshops in Cape Town and Johannesburg. EDRO believes that if a consistent and high quality robocoding education programme is introduced to schools, we'll see more cross school collaboration, regional and national leagues and competitions, and coherent standards of learning and educator expertise. We would welcome participation across schools, and our main aim is to ensure that schools and those passionate educators are well supported.

Our US partners have spent over 15 years developing their robotics curriculum working with Parallax, a respected robotics manufacturer. EDRO's curriculum was developed from this basis and adapted to the South African context with the aid of professional educators. It is of a high standard, contains rich content, well defined learning outcomes, fully prepared lesson plans and activities. The curriculum is easy to follow, with minimal preparation required by the educator. One of the challenges that South African educators face is the general perception that they lack the skills to teach robotics. The EDRO programme is very easy to follow for those who have had no exposure to robotics or coding. The current curriculum consists of the following different programmes, all using the S2 Scribbler Robot:

- Little Ones programme Grade R
- Little Ones programme for Grade 1 - 3
- Juniors programme for Grade 4 - 7
- Teens programme for Grade 8 - 12

Why the Scribbler Robot

- Relative low cost
- Durability - the robot is tough
- Most repairs require fairly simple technical skill level to perform
- One Robot to support curricula Grade R-12
- No small parts which can get lost or pose a choking hazard

Lesson Details

Learners will be guided through their first experience of programming a physical robot. An emphasis is placed on inspiring pupils to enjoy solving problems. They work in teams of 2 to facilitate learning through discovery and developing social skills. The five major coding concepts: sequence, variables, loops, functions and choices, are woven into all programmes and applied in gradual stages. We place emphasis on collaborative problem solving, imaginative games and a focused, yet playful learning environment. This approach allows EDRO to break down traditional barriers, giving learners who do not see themselves a 'technologically adept' a chance to engage in this important field. Those with a natural aptitude on the other hand are stretched to the threshold of their ability.

Little Ones: Grade R - 3

The Little Ones are introduced to the exciting world of coding through a game-like approach. The lessons are problem-based, guiding learners to make their own discoveries as they solve different problems with their robots. Each module provides between 4 - 6 hours' lesson content as the pace of lessons in this age group has larger variability. Reception learners also may not be able to read yet and as such their material has been designed to accommodate for this fact. Lessons are generally shorter to achieve maximum engagement and being cognisant of attention span in this age group. All coding is "written" first by arranging magnetic code tiles on a whiteboard. Code is then uploaded to their robots via a remote control. Code algorithms are executed on a physical course mat to evaluate if the desired goal was reached.

Module 1: Learners are introduced to the concept of coding and how to structure a set of instructions in a logical order to achieve a specific outcome. Three main concepts are focused on namely writing, uploading and executing code. Learners are introduced to debugging and how different algorithms can be used to solve the same problem.

Module 2: Coding constraints are introduced and a substantial amount of time is spent on the subject as the constraints become increasingly narrow and difficult. Geometric shape drawing also now become part of the RoboCode challenges and learners see how mathematics become very important in coding problems. Module 2 will also mark the end of the Grade R curriculum as Module 3 and Module 4 will be too advanced for these little ones.

Module 3: Two new coding concepts are introduced: Loops and Functions. Learners are guided to identify patterns or repeats and how to use loops in coding to make more efficient algorithms. Learners are introduced to functions, a key coding concept and must now use functions and loops to solve intricate coding challenges.

Module 4: The concepts from module 1 - 3 are reinforced and a last new and very important coding concept namely Choices, or Conditional Statements are introduced. Learners incorporate this new concept along with all their prior learning to solidify their coding skills and to reach a level of coding mastery on their age level as they work through more complex challenges.

Juniors: Grade 4 - 7

The Juniors are introduced to coding via a drag-and-drop interface, minimizing the barriers to entry and making this a perfect course for those with no coding experience. However, for those with a more technical bend, there are some special "tough cookie" problems to test their grey matter! Learners learn the foundational principles of computer programming while being engaged and excited by seeing their code come to life on their moving robots. The lessons are problem-based, guiding learners to make their own discoveries as they solve different problems with their robots. Each module provides 8 hours' lesson content.

Module 1: In the first module, participants are guided through their first experience of programming a robot to follow instructions. An emphasis is placed on inspiring pupils to enjoy solving problems. Most problems in centre around movement based challenges. Participants make their own discoveries while programming their robots to draw a specially crafted series of geometric shapes. Key coding concepts covered in this module include sequence, loops and subroutines.

Module 2: In the second module, learners are now eager to wander deeper into the unexplored terrain of 'Robot Choice'. How can an inanimate machine make a decision? How can a programmer solve problems that take unknown factors into consideration? In this module, the 'conditional statements' or 'choice blocks' will be used to answer these questions practically. Problems worked on in this module involve participants integrating input from their robots' sensors into their code. Learners will explore the light sensor and infrared or distance sensor and use these for solving physical problems. Learners continue to work in a drag-and-drop coding interface.

Module 3: In the third module, participants add two new programming tools to their toolbox: variables and functions. Using these two foundational concepts, learners get to work creating intricate and interesting patterns and solving more complex problems. An emphasis is placed on introducing pupils to variables and functions in a concrete manner, thereby ensuring that these two building blocks are firmly established. Coding is done in a new platform that is a combination of drag-and-drop and line-based coding bringing learners closer and making them comfortable with the idea of line-written code.

Module 4: The final module combines all of the prior learning and all 5 building blocks of coding - sequence, loops, variables, functions and choice - into complex challenges that require longer planning, debugging and iteration. Many of the challenges in this module take on the form of competition and learners are motivated by achieving results for which the bar is set quite high. Learners continue to code in the combination drag-and-drop and line-based interface.

Seniors: Grade 8 - 12

The Teens are introduced to coding like a real computer programmer. All concepts are explained simply, in a well-structured, step-by-step manner making the lessons perfect for even those with no coding experience. However, as all coding is text-based and done in a very common and widely used command-line level language called C, there will be ample scope to push the boundaries and tackle some very tough challenges. The lessons are problem-based, guiding learners to make their own discoveries as they solve different problems with their robots. Each module provides between 8 - 16 hours' lesson content depending on the learning pace of the age/grade group.

Module 1: Emphasis is placed on getting learners used to a new way of writing code and getting skilled and comfortable with coding syntax. All coding challenges revolve around geometric problems focussing the learners attention on the mathematical problem while sharpening their code writing skills. Later in the module when everyone is comfortable writing and debugging line-based code and syntax, variables and if-statements are introduced.

Module 2: Learners expand on their knowledge of line-based coding and how to approach problems with efficient logic. Subjects covered in this module including expanding of data types, variables with mathematics, variables and arrays, advanced conditional statements, multiple decisions and loops. The length of lessons in this module will vary substantially subject to the relevant age group.

All programmes incorporate key learning outcomes to varying extents:

- Computation: Building a solid foundation in key computational concepts paving the way for further study in the field.
- Mathematics: Providing a practical setting in which Mathematics can be applied to computational problems.
- Science and Technology: Conveying a broad general knowledge of scientific topics related to the field of robotics and computer science.
- Problem Solving: Developing a problem solving skill-set that can be applied in new and novel situations.
- Arts: Complex drawings and music are created using the robots.

EDRO reserves the right to change or update the above at any time and without notice. Modules are constantly being updated and improved and as such a certain extent of flexibly is assumed with the course content.

Logistics

In order to deliver a high-quality experience, it is important to understand the requirements for successfully delivering the RoboCode academy or workshop.

Venue Requirements

Little Ones (Grade R - 3)

A venue that can accommodate up to 20 learners as well as a designated area close to the venue to lay out 10 ground mats of 1.25 x 1.25 metres. The mats are the platforms on which the robots move when their code is executed.

Juniors and Teens (Grade 4 - 12)

A venue with tables and seating for learners and a computer lab with enough computers for each grade class working in teams of two. Some open floor or table space either in or nearby the venue in order for robots to execute code.

Computer Hardware and Software Requirements

All Little Ones curriculum require no computer hardware.

- The Junior Module 1 and 2 require Windows Vista, 7 or higher operating system.
- The Junior Module 3 and 4 can run on either Windows, Mac or Chromebooks.
- The Teens Modules all run on either Windows or Mac.

There is no compatibility with iPad or iPhones and limited Chromebooks compatibility.

The robot software and USB drivers will need to be installed on these computers. Should the school not be able to offer a suitable computer facility EDRO can assist with the sourcing and purchasing of laptops or computers.

EDRO's Proposal

There are various ways EDRO provides access to its RoboCode curriculum:

- Schools can purchase curriculum licenses and robot equipment from EDRO to run their RoboCode curriculum in school or as an after-school academy.

- Secure CSI and other funding to support programme implementation to disadvantaged and lower quintile schools.
- **EDRO offers qualified and dedicated individuals the opportunity to invest in their own EDRO franchise (Pods) in approved areas for running after school EDRO Academies, Weekend and Holiday Workshops. The Pod Coach (Owner) is an independent business owner looking for a rewarding career developing children whilst earning a profitable income.**

EDRO In-school Academy

Rental Equipment with Teacher Facilitators

EDRO can provide the necessary training to teachers that the school nominate to facilitate RoboCode classes during school time or as an extramural activity. Teachers for Little Ones and Junior programmes do not need to have any prior coding experience. The Junior programme does require a firm grasp of basic mathematics and logic whereas the Teens programme would require a basic knowledge of simple line coding (normally an ICT teacher is a good candidate).

EDRO will rent all robotic equipment, supporting equipment (excluding laptops or computers) and stationary needed to deliver the programmes successfully to the school on a per term basis. The cost of training and providing hired equipment is R500 per child per term.

Purchasing EDRO Curriculum and Equipment

EDRO will provide all initial training as part of the licence. Ongoing support will be provided and supplementary or refresher training will be handled on an ad-hoc bases as detailed in the legal agreement that will be agreed between EDRO and the Pod owner. EDRO allows Pod owners to purchase curriculum and equipment tailored to their specific requirements.

The costs are broken down in the table below:

Capital Cost	**Cost**
EDRO Curriculum Licence for Schools (once-off)	R 50,000
Professional fees - including legal and administrative	R 10,000
Little Ones Curriculum	R 20,000
Junior Curriculum	R 25,000
Teens Curriculum	R 15,000
S2 Scribbler Robot (supporting all curricula - 2 learners per robot)	R 1,500
Little Ones magnets board, remote, magnet tiles and mat set (2 learners per set)	R 1,000

Other important considerations when purchasing the EDRO curriculum for your school:

- Curriculum training time
- AA batteries for robots and remotes as well as battery chargers
- Robot maintenance (replacement parts) - EDRO can provide support and recommended suppliers for parts
- Accessibility of computer facilities or purchase of own Computer Equipment for Junior and Teens curriculum