LITTUP NEWS

A Collaboratorium newsletter, Faculty of Education, University of Pretoria

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Make today matter

DREAM 2 ...

Over the past three years of the LLITUP News publication, we have shared many of our dreams with our readers. We always love to...

- Dream2Teach
- Dream2Research
- Dream2Play
- Dream2Explore
- Dream2Learn

Froggy's Tech Corner has become a space where we share our thoughts and experiences using a variety of tools. We have shared our actions in terms of events and teaching and how we love to inspire others, and learn so much from them as well.

In Issue 2 of 2022, we have a jampacked set of experiences to share. We have positioned ourselves as role players in the field of Coding and Robotics. This is demonstrated in this issue with articles on the Coding and Robotics symposium that LLITUP hosted, integration of Coding and Robotics in JST320, as well as the module development process of Early Childhood Education Coding and Robotics.

Dream2Teach is focused on the second round of the Re-imagine teaching initiative, as well as Badges4Edu prospects for 2023.

Our Dream2Research section focuses on our plans to incorporate Coding and Robotics into postgraduate research, our contribution to the Faculty Research Day, as well introducing our work with Coding and Robotics at the WIL stakeholder event.

Froggy had a blast in this edition. With articles on screens, our own coding tool development, as well as our exploration of new Coding and Robotics family members, take centre stage.

May we never stop dreaming...together!

NEWSLETTER TEAM

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CODING AND ROBOTICS SYMPOSIUM 2022

MAKING CODING AND ROBOTICS ACCESSIBLE FOR ALL LEARNERS

A symposium that involved teachers, academics, and researchers to explore Coding and Robotics implementation at school level
~By Annèl van Rooyen, Jody Joubert and Ronel Callaghan~

Wednesday, 28 September 2022 saw a LLITUP dream come true as we hosted Coding and Robotics enthusiasts during the Coding and Robotics symposium. We welcomed about 60 people in the F-lab and had an additional 50 to 80 people who joined the different sessions online. Attendees appreciated the well-integrated Hyflex mode of presentation of the day. Opportunities for discussions, future collaborations, and true excitement about the good work being done in the field were evident.

The day's programme was filled with hands-on activities, the sharing of wonderful practices and practical insights. After Prof Callaghan's welcoming and introduction, Prof Jean Greyling of the Nelson Mandela University and Tangible Africa shared his thoughts on *It's not about coding: The unplugged story.* He also introduced the audience to the tangible coding game *Tanks.* Up next, was Mrs Anita van Vuuren who shared valuable insights about the demystification of coding in her online presentation titled *Educational heuristics for designing an online TPD intervention to demystify coding.*

Prof Marietjie Havenga and Dr Suki van Zyl from the North-West University presented an online presentation showcasing their work of integrating Coding and Robotics across different university-level subjects. They use, amongst others, tools like LEGO Mindstorms EV3, Micro:bit and 3D printing. The title of their presentation was *Programming and robotics to develop self-directed learning.* Up next, we had an explorative discussion where Mrs Erna Erasmus from AROS and Ms Nadia Swanepoel from UP shared their experiences, challenges, and dreams of Coding and Robotics module design for undergraduate teachers. It showcased different ways of approaching this task and led to valuable tea-time discussions and idea-sharing.

The tea break's enjoyable eats and drinks refreshed us to engage in Prof Ronel Callaghan's session about *Coding and Robotics as enabler for interdisciplinary teaching: The LLITUP story.* Attendees in the room had a short hands-on play session with the Bee-bots, while online participants were shown what was happening across the room. After this, Dr Patricia Gouws from UNISA shared the value and practices of Massive Open Online Courses (MOOCs) for teacher training, also aimed at Coding and Robotics. Her presentation was titled *The use of MOOCs in support of Coding and Robotics advancement .*

After lunch, three further speakers shared their in-practice experiences. Mrs Marietjie Havenga from Skuilkrosies presented *Coding for preschoolers.* She focused on five coding terms that preschoolers can understand and provided exciting photo evidence of this from her own work with the young children. Mr Felix Spies from Split Second Science Education Foundation shared six key pieces to success in a rural setting. This relates well to the symposium focus of making Coding and Robotics accessible within different communities. His presentation was titled *A case study of robotics academies in the John Taolo Gaetsewe District Municipality, Northern Cape.* Before the day's end, Mr Keith Gibson from Collegiate Girls High shared the value and practices of developing learners' problem-solving skills in his online presentation titled *Problem-solving: Learning to walk before the robot runs.*

The symposium situated LLITUP as a place to soundboard ideas for innovative implementation of Coding and Robotics in the Basic Education sector, as well as a research partner in the Coding and Robotics focus area. The future and what it promises for Coding and Robotics teaching is exciting!

CODING AND ROBOTICS SYMPOSIUM 2022

Photos
TOP: Attendees in the F-lab
MIDDLE LEFT: Attendees engaged in hands-on activities; **MIDDLE RIGHT:** Gontse and Farihah welcoming attendees to the Collaboratorium
BOTTOM: Symposium presenters and the LLITUP team
Top, from left to right: Mr Felix Spies, Prof Jean Greyling and Dr Patricia Gouws;
Middle: Ms Gontse Mthelebofu, Ms Nadia Swanepoel, Mrs Erna Erasmus, Mrs Marietjie Havenga;
Bottom: Prof Ronel Callaghan, Mrs Annèl van Rooyen, Mr Jody Joubert and Ms Farihah Jaffer

DREAM2PLAY

LLITUP and the Early Childhood Education Department joined hands again for the integrated teaching of Science and Technology (JST320) through Coding and Robotics
~By Nadia Swanepoel and Annèl van Rooyen~

After four years of collaboration with the Science, Mathematics and Technology Education (SMTE) department, the interactive session on Coding and Robotics has become an annual event that all look forward to in the Early Childhood Education (ECE) department. This year, the third year ECE students were treated to Coding and Robotics with a twist. Mrs Trudie Didloff and her team from Tangible Africa presented a session on Coding and Robotics from the perspective of the coding app *Boats powered by Tangibl.* Approximately 60 students attended the event as part of Science and Technology in the Foundation Phase (JST 320), which took place in the Normaal Hall on Thursday 13 October 2022.

The session started off with ascertaining what students' understanding of Coding and Robotics entails. Mrs Didloff focused on demystifying Coding and Robotics to the ECE students and assisted them in understanding that coding is the same as writing and executing a set of instructions. Students were given a practical example and asked to sequence the steps necessary to make a cup of tea. Another example that was given to students, was playing the game of "Simon says". As Mrs Didloff gave the instructions, students had to listen to and carry out these instructions– such as standing on a chair, clapping hands, nodding their heads or jumping up and down. The emphasis was placed on unplugged coding through a play-based approach.

Later on, students were guided to code using the applications *Boats and Tanks powered by Tangibl.* This engaged students in practical problem-solving as a means to develop a code that can move the boat in the app to the desired destination. It was truly an eye-opening activity to see the ECE students exhibit values of diversity and acceptance, as well as skills of collaboration, listening and reasoning. The discussions that came from each group were testimony to the amount of learning through play that took place.

With such an amount of learning that took place through fun, collaborative discussions and creative problem solving, it amplifies the need for the development and introduction of coding and robotics in the foundation phase.

This event was made possible by the efforts of Prof Jean Greyling from Nelson Mandela University along with his Tangible Africa team under the guidance of Trudie Diddloff. LLITUP's Prof Callaghan and Mrs Annèl van Rooyen helped organise the event on UP's side.

Photos
Left: Tanks game tokens; **Right:** Boats game screen

DREAM2PLAY
ECE BOATS SESSION

Photos
TOP LEFT: Students playing Simon Says
TOP RIGHT: Students organising steps for making tea
MIDDLE LEFT: Students coding using a real-life board game
MIDDLE RIGHT: Students playing Tanks coding app game
BOTTOM: Tangible Africa team and UP lecturers
From left to right: Ms Nadia Swanepoel, Mr Bafana Tsabalala, Mr Neo Cyprian Moleejane, Ms Abigail Mlambo, Ms Lerato Hlatshwayo, Mrs Trudie Didloff, Mr Gift Malope and Mrs Annèl van Rooyen

DREAM2TEACH
LLITUP'S DRIVE FOR INNOVATIVE TEACHING

Possible Coding and Robotics teacher training opportunities by LLITUP
~By Jody Joubert and Annèl van Rooyen~

The LLITUP research unit with its feet firmly within the Science, Mathematics and Technology Education (SMTE) and the Computer Integrated Education (CIE) unit of the department, has developed a range of training opportunities for teachers interested in Coding and Robotics. These include:

1. Coding and robotics for Early Childhood Education
2. Coding and Robotics for Intermediate and Senior Phase Education

With Bee-bots and mBots, amongst others, these training opportunities facilitate planning for the integration of Coding and Robotics within teachers' own contexts. Every training session is also customised according to the needs of the group.

Additionally, the long-standing Mobile Learning course provides a good basis for teachers of Coding and Robotics. The course allows teachers to develop their technological integration skills with the multitude of technologies that supplement the teaching of coding and robotics.

Badges4Edu initiative for 2023
~By Gontse Mthelebofu and Annèl van Rooyen~

NEWS FLASH

With Gontse Mthelebofu's passion to drive this initiative forward, lecturers can expect to be invited to sessions aimed at the conceptualisation of new badges for 2023.

The Badges4Edu initiative is valuable in its ability to stimulate innovative integration of technology and associated teaching methodologies in undergraduate teacher training. Several research projects, at both MEd and PhD level, have also originated in this initiative. We hope to see many lecturers across departments involved in 2023's initiative.

DREAM2TEACH
MODULE DEVELOPMENT PROCESS AND PROGRESS

Sharing the collaborative effort of the SMTE and Early Childhood Education departments to develop an ECE Coding and Robotics module
~By Annèl van Rooyen and Nadia Swanepoel~

"Collaboration = Dream job
Coding and Robotics requires all to work together to achieve common goal." Mr Lejone Lekhanya

Mr Lekhanya, attendee of LLITUP's Coding and Robotics symposium, came to a very valuable conclusion about the implementation of the teaching and learning of Coding and Robotics as quoted above. Staff members of the the SMTE and ECE departments are experiencing just the same: the combination of expertise of Coding and Robotics and Early Childhood Education specialists hopes to achieve a collaboratively-designed module for undergraduate ECE students aimed at the teaching and learning of Coding and Robotics in future.

The task team is lead by Ms Nadia Swanepoel from ECE. While some departmental staff join us from time to time, Ms Swanepoel and LLITUP's Annèl van Rooyen have spent several hours in weekly planning sessions. The module planning process is based on the Appreciative Inquiry (AI) process, as introduced to us during the first round of Re-imagine, presented by LLITUP in 2021.

The task team started off with a Dedication phase, an addition to the AI process. Here, we considered our motivation, possible contributions and dreams for the module development initiative. We spent several weeks in defining, discovering, and dreaming what content, pedagogy and technology (amongst others) we want to include. The Design phase, supported by Nadia and Annèl's preparation and Prof Callaghan's guidance as our consultant, saw us taking our planning to a new level. We considered our intended outcomes, assessment and teaching within the Backward Design model. To support our building of teaching and learning activities, we are currently enaged in hands-on exploration with several Coding and Robotics tools which is yet another exciting and enriching experience.

Photos
LEFT: The Appreciative Inquiry process used for the module design process
RIGHT: Annèl hands Nadia her Thank You gift after Nadia shared our ideas and module planning process at the Coding and Robotics symposium

DREAM2TEACH
RE-IMAGINE TEACHING AND LEARNING AT UP (2022)

A second round of LLITUP's Re-imagine teaching initiative was held at the end of the 1st semester of 2022
~By Ronel Callaghan and Annèl van Rooyen~

Background

The aim of this initiative was to follow a conscious process of module re-imagining, whilst revisiting innovative use of space, time, and strategies to prepare students for a complex, changing world i.e. a complex system with interrelated parts. We aimed to design for immersive learning which are mindful and purposeful, layered, open, dynamic, and transformative. Annèl van Rooyen posed a few questions to Prof Callaghan about the initiative.

When was this initiative presented?

8 June to 13 July 2022

How many people participated this time round?

24 people, representing 16 different departments in the University attended sessions. 16 participants completed the re-imagine process.

How was this round of the initiative different from the previous round?

This round was presented during the examination period in the first semester, which enabled participants to focus on second semester modules. The process was distributed over a shorter period of time. We met weekly on Wednesday afternoons from 13:00 to 15:00. Participants often came earlier or stayed later to work on their designs. Most sessions were presented in HyFlex mode. It seemed to be more manageable for lecturers than during semester time.

Did you change the process, content, order and/or structure after the first presentation of Re-imagine in 2021?

We followed the same process as in the first UP Reimagine Teaching initiative in 2021. The process was again planned according to the Appreciative Inquiry design process (Whitney & Cooperrider 1998, Razzetti 2019). We find this to be an effective and positive change management approach. It included the phases *Define* (which states the goal of the inquiry), *Discover* (finding the current strengths), *Dream* (allow for exceptional and innovative possibilities to reach the goal, based on the strengths discovered), *Design* (develop a plan that can make a dream or at least a part of the dream, reality), and *Destiny* (implement the design through immersion in the reality).

What feedback did participants have?

Participants found the process meaningful and inspiring. The shared experience across disciplines enriched their thinking about not only their modules, but also their broader teaching approach and role as educators. All participants indicated that this type of intervention should be repeated yearly.

"I did not feel like I was attending "training". Instead, I felt supported, empowered and guided through well-designed workshops and modeling from the facilitators on how I can improve my practice." *~Ms Nelé Loubser, SMTE department*

"I found the experience to be extremely fruitful and reignited my passion for teaching." *~Dr Ntombi Gama*

"For me, the weeks of engaging with the team and the colleagues from other faculties opened up a whole new creative and innovative world of teaching and learning -in all my modules, not just the one I re-imagined, I approach the classes differently. My assessments have changed and even class attendance is not a challenge anymore. *~Mrs Elmien Claassens*

DREAM2RESEARCH

Prospects of more research focused on Coding and Robotics in postgraduate studies
~By Jody Joubert and Annèl van Rooyen~

We have identified a need for research in the field of educational Coding and Robotics. This led us into 2023 planning aimed at including Coding and Robotics as a large focus in Computer-Integrated Education research. While MEd and PhD students are already studying the topic, a prospect for Honours students to become involved in this field of research is emerging. We hope to inspire more MEd and PhD studies focused on the topic.

A question that we encounter frequently, is the best choice for Coding and Robotics tools. This is one of the focus areas of our intended research field. Other foci include the question of developing subject knowledge of Coding and Robotics; the integration of Coding and Robotics pedagogical knowledge with subjects and teaching in general; exploring how Coding and Robotics tools and other edtech support each other. We intend to also not be tool-driven, but keep the infrastructural footprint of the integration of Coding and Robotics into teaching and learning in mind. This requires a consideration for the hardware and software considerations of such implementation plans as well.

Another focus will include robot exploration. This will involve more of a qualitative analysis aimed at the characteristics and teaching and learning possibilities, rather than simply quantified information about the different robots. We hope to identify the qualities that every robot brings to the teaching and learning setting whereby an educational focus is maintained.

The intended theoretical frameworks still include the Technological Pedagogical and Content Knowledge (TPACK) framework, technology acceptance models including Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT) model, technology integration models like Technology Integration Planning (TIP) model, Substitution Augmentation Modification Redefinition (SAMR) model and others.

The Dream2Research continues...
~By Jody Joubert~

As introduced during the faculty research day, LLITUP strives to be a building ground for inter- and transdisciplinary research endeavours within the faculty and beyond. The research unit has its values within the Living Lab paradigm, aiming to solve problems, enhance innovation and education transformation collaboratively and in a transdisciplinary manner.

Currently, we are focused on research that will inform three main foci:
1. The accessibility of coding and robotics and other digital competences and skills across all education sectors
2. The integration of rapidly developing and readily available technologies in innovative, active and current teaching and learning practices
3. The development of teacher skills in the teaching and learning of all subjects in 21st century education, digitally competent and future-oriented education.

We look forward to many involvements in research on multiple platforms in all sectors of education.

DREAM2RESEARCH

LLITUP hosted the Education Faculty Research Day
~By Ronel Callaghan and Annèl van Rooyen~

The research-focused morning, themed *Sharing (educational) research across silos,* focused on transdisciplinary, interdisciplinary and collaborative research. The first keynote speaker, Dr Hester du Plessis, provided a sound theoretical background to Transdisciplinary research. Her presentation was titled *The ambivalence and ambiguity of research transformation and transgression.* The second keynote speaker, Prof Liesel Ebersöhn, shared exemplary transdisciplinary research examples. Her presentation was titled *I didn't know people could give data -when the challenge requires more than focusing exclusively on one discipline.* The remainder of the program was split into two break-away sessions with insightful research shared, followed by meaningful discussions. One of the break-away sessions also included sharing of emerging research ideas in the form of quickfire research pitches. This was very well received by the audience.

The LLITUP Collaboratorium

and

The Department of Science, Mathematics and Technology Education

presents

FACULTY OF EDUCATION RESEARCH DAY

TRANS - DISCIPLINARY
INTER - DISCIPLINARY
COLLABORATIVE
COMMUNITY

Sharing research across silos

BREAKAWAY SESSIONS	
Venue 1: Auditorium	**Venue 2: Auditorium Annex**
10:30 – 10:50	
Seabilwe Tilodi and Clinton van der Merwe	**Zijing Hu**
GeoSpatial Data Science Certificate we piloting as SAGTA, UP, the IEB and Kartoza	Exploring teaching, learning, assessment and practices of the acupuncture programme to improve children's health
10:50 – 11:20	
Shannon Wakefield	**Climant Khoza**
Exploring adolescent resilience during COVID-19 in a township context	Exploring Natural Sciences pre-service teachers' reflective practices when done individually and in groups
11:20 – 11:40	
Joyce West	**Adebunmi Aina**
ULWAZI LWETHU PROJECT: Quality assurance and review of African language Foundation Phase texts	Reimagining systems that support early childhood development centres in offering quality education through activity theory
11:40 – 12:00	
Lumbani Tshotetsi	**Interdisciplinary research pitches**
Authentic, simulated and peer learning in the Bachelor of Clinical Medical Practice (BCMP) at the University of Pretoria	**Climant Khoza**
	Researching science teacher education practices
	Fru Akuma/Nele Loubser
	The implementation of the spiral theory-based curriculum model in pre-service STEAM teacher education: A case study

Photos
TOP: The Faculty Research Day logo
BOTTOM: Presenters and presentations of the break-away sessions

E-VENTS

Engaging Work-Integrated Learning (WIL) partners in Coding and Robotics
~As described by the LLITUP team~

On 21 September 2021 the Faculty of Education welcomed multiple WIL partners to campus. LLITUP was there to showcase our work in the collaboratorium with a focus on the teaching and learning of Coding and Robotics. The team worked hard, and had a ball while doing so, in preparing for exciting learning endeavours in which to engage the attendees in. From badges, Bee-bot mats and stories, to new Bee-bot games aimed at Mathematics and numbers - a host of activities were displayed. Attendees, including school principals, teachers, students, external lecturers, staff from the WIL office and also other faculties had the opportunity to engage with our tools and resources.

The road safety map, created by Jody in 2020 already, featured again. This time, however, it had ready-packed codes associated with it that attendees could come and debug (i.e. find the error in the code) by placing bug pictures on the incorrect codes. This gave a new and exciting twist to the computational thinking practice of debugging.

The new Maths game entails some mathematical reasoning. The aim of the game is to reach the highest possible score within 10 moves on the mat. It works as follows:
1. Choose a number to start off with
2. Go through different Maths operations as indicated on the mat
3. Do the Maths and calculate your score

For some of the attendees, Coding and Robotics was a new and exciting field. Others could share their own experiences in the field. Those that engaged with our activities managed to get badges including badges called *Code Cracker, Bot Master, Programmer* and *Debugger.* It is advantageous that no previous coding experience is required for attendees to interact with the resources, tools, and games presented by LLITUP.

An outcome of this event was that the WIL office shared our Coding and Robotics symposium invitation with everybody that was invited to the WIL event.

Photo
Badges add an element of gamification to a learning experience. These four coding badges were designed and described by Farihah Jaffer

FROGGY'S TECH CORNER

Exploring the Clevertouch interactive board
~By Jody Joubert and Annèl van Rooyen~

The F-lab in the Natural Sciences building is now home to the 75" interactive board, the Clevertouch. It was sponsored by Interactive AV Solutions. This versatile board is supported by both Android and Windows operating systems. While it allows for teaching using Lynx for quizzes, as well as other interactive activities, we have also experimented with this board in several ways. One element of LLITUP's exploration is the identification of additional apps that can be integrated into the device's own app store.

A highlight of this board is how it enables seamless integration into hybrid teaching and learning. As a tool, this board really assists us in bringing those beyond the classroom walls (especially online) into the face-to-face classroom experience. One such an integration that had people talking and involved all audience members well, was at the Coding and Robotics symposium. Both participants in the room and the online attendees were equally well involved.

Some other benefits of the board include its mobility. Since the screen is mobile, it can be brought closer to the audience for better vision. This also has potential for flexible classroom teaching spaces. For writing purposes, the board allows the user to write on pictures. It can also transfer handwriting to text as well as recognise handwritten mathematics equations.

From the students' perspective, the board's Wi-fi and pin connectivity allows for sharing of materials between students and the board. Even more, students can write on the white board from the comfort of their chairs.

We are excited about the possibilities that the board presents, as well as further collaboration with Interactive AV Solutions.
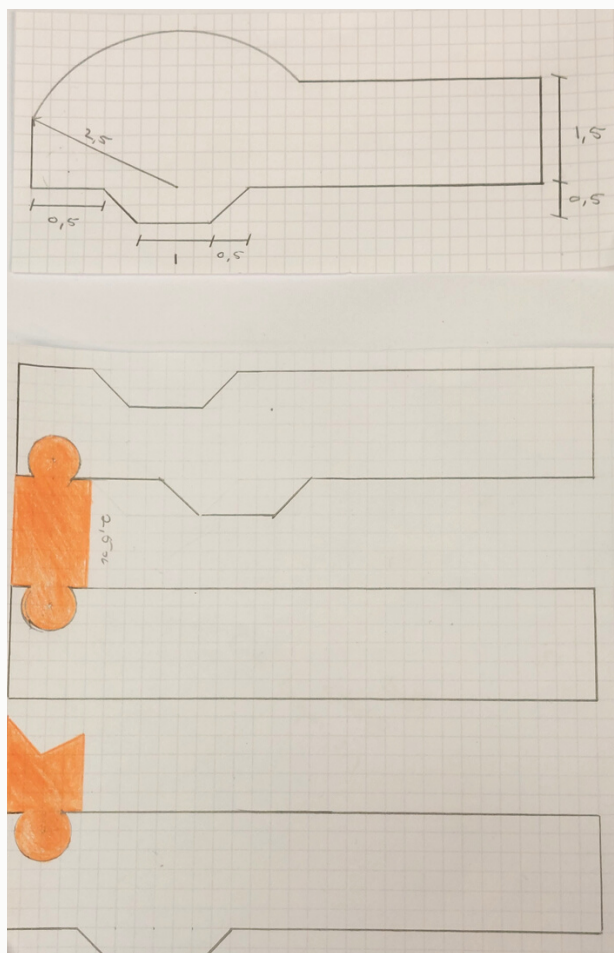
Photo
Prof Callaghan, Farihah Jaffer and Jody Joubert welcoming the Clevertouch board to the F-lab

FROGGY'S TECH CORNER

Developing tangible tokens for Scratch
~By Jody Joubert and Annèl van Rooyen~

Coding can be made accessible to learners by means of tangible computing. Tangible coding languages incorporate physical objects. Tools like *Tanks powered by Tangible* and *Scotty Go!* use tangible cards that are packed like puzzle pieces and then scanned using a digital device for some on-screen action. The block-based coding language *Scratch* is a screen-based application that teaches learners several coding concepts. It is also an open-source coding language which is highly beneficial in terms of accessibility. We have identified a need to turn these online coding blocks into tangible puzzle pieces as well.

When browsing for such tangible resources, online pictures are available. Prof Callaghan and Jody decided to design their own Scratch blocks to be cut from perspex. These blocks can then be built like a puzzle and modified using dry-wipe markers. The puzzle-effect (i.e. the pieces must fit, otherwise the code cannot be executed successfully) is a key component of this tangible learning experience.

The approach to using these tangible Scratch blocks will entail the following:

1. Start building block-based code using the tangible Scratch blocks
2. Explore with the online Scratch coding application
3. Progress to coding a robot like mBot, LEGO or Arduino-based robots

We are looking forward to making and playing with the anticipated final product.

Photo
TOP: Jody's drawings in preparation for perspex Scratch blocks

Photo
LEFT: The website i-Compute has made the range of Scratch blocks available as separate pictures. This resource can be downloaded and used.

Download it at:
http://www.icompute-uk.com/news/editable-scratch3-blocks/

FROGGY'S TECH CORNER

LLITUP's Coding and Robotics tools
~By Jody Joubert and Annèl van Rooyen~

The LLITUP Collaboratorium is continuously testing and evaluating various educational (and other) robots, as well as Coding and Robotics tools that can be used in the teaching and learning of Coding and Robotics at all levels of education. Over the five-year period of the Collaboratorium's existence, various robots have been acquired for testing

Our first engagement with robotics came with a beautiful pink mBot, provided by Google in early 2017. This paved the way for our questioning of the place and importance of robots in the educational sector. Currently, the Collaboratorium has 12 different robots that have been acquired. These robots have been acquired in two ways. Firstly, the Collaboratorium identifies and acquires robots after careful consideration. Secondly, stakeholders from private industry often donate, or lend robots to the Collaboratorium. In either case the robots (and other types of Coding and Robotics tools) are evaluated to identify key factors linking them to possible solutions that they can offer to education.

As these tools are regularly and rigorously tested for the possibilities they offer to the education sectors, we link it to evaluation criteria. These include , but are not limited to, the rationale for the tool choice; the computational thinking and other concepts that can be developed while using the tool; its cost and durability; the possible uses of the tool and the type of coding that can be done with the tool. Furthermore, we look at descriptions in terms of hardware and software; its technical requirements; manufacturer and/or supplier. We also consider its intended age spectrum; educational method; anticipated play situations built into the design; as well materials that can accompany the tool. We look at how different tools can be implemented as mindtools and then we categorise the robots.

In 2022, Scotty Go! and Photon was sent to LLITUP for evaluation and exploration. While Scotty Go! is here to stay, Photon is only visiting Froggy in the lab. On our own terms, we have acquired Bopper, Hip and Hop, some members of the Coding Critter family. Our Bee-bot family has also extended from six to twelve members. Other robots from the TTS group, suppliers of the Bee-bot, that have joined our Coding and Robotics club include the Blue-Bot and the Pro-Bot. The BeCreo kit is also amongst our current collection.

Photo
From left to right, some of our robot family now includes the Blue-Bot, pink mBot, Photon, blue mBot, Bee-bot and LEGO Mndstorms EV3 (an elephant built here) in the back

FROGGY'S TECH CORNER

Introducing Coding and Robotics tools: Coding Critters
~By the LLITUP team~

In search of a more affordable alternative to the Bee-bot, Farihah Jaffer decided to purchase the Coding Critter named Bopper. The tool was easily available from Takealot at R800 (April 2022). By now, the Critters are priced at R1000. While affordability and easy accessibility were some of Farihah's criteria, she was introduced to the tool in MEd student Embeth van der Wal's study that used Coding Critters for teaching and learning.

Farihah acquired the bunny Bopper with playmates Hip and Hop. Other animals that form part of the Coding Critter family include Skye, the unicorn with a wand for remote-controlled coding; the dinosaurs Rumble and Bumble as well as the cats Scamper and Sneaker. While we have not welcomed an entire family of Coding Critters to the lab, we assume that every Critter will make different sounds and include different play scenes, but that the same coding principles will be applied.

The Coding Critters, produced by Learning Resources, are aimed at learners four years and older. They enable tangible coding using buttons on the robot and allow for screen-free coding. The tool has a play mode where the robot's buttons can be used to play with the critters as real toys that move around and make different sounds.

While playing with the Coding Critter, Farihah compared her Coding Critter experiences with what she knows about the working of Bee-bots. Key differences that she highlighted, include the following:
- The Coding Critter does not make 90 degree turns, but rather more round movements
- The play set was accompanied with some footprint-shaped coding cards, but these are not enough to pack out a complete, more complex code
- The Critter has a memory of 30 steps, in comparison to Bee-bot's 40 steps
- The Critter has four wheels instead of two. Their alignment can also be changed
- Movements are shorter where Critters move 10,2 cm at a time in comparison to 15cm of the Bee-bot
- The Critters' movements are smooth without stopping between steps, while the Bee-bot makes a small pause after every step
- The Critter does not have a memory of punched-in movements. While this requires that the code needs to be written down or packed using the coding cards, it is not a problem for the intended age of the tool. Young learners, aged four years and older, typically do not want to repeat steps while playing. They prefer to explore different scenarios every time, thereby avoiding repetitiveness and including some variety in their play.

The Coding Critter's associated props (the playground) are cute, although this play scene limits the imagination. The robot's magnetic nose that can connect with the smaller critters, as well as its ability do draw a wagon do, however, provide enjoyable variation in the play scenes. While Farihah did not use the coding storybook that came with the set, it is another nice resource to introduce learners to the tool's different functions and possibilities. The Critter has a sweet variety of sounds.

To its disadvantage, the Critter is powered by 3 AAA batteries and not a rechargeable battery.

FROGGY'S TECH CORNER

Introducing LLITUP's Coding and Robotics tools: Photon and Scotty Go!
~By the LLITUP team~

Photos
LEFT: Our robot family with the white Photon with its antenna ears at the back and Bopper, the Coding Critter with its blue ears in the front middle
RIGHT: The Scottie Go! kit with its cardboard field and tangible cardboard coding pieces

Photon

Wherever you find yourself in the age range of 3 – 99, its designers claim that it can work for you! Photon can move anything from 10 – 60 cm at a time, makes both 45 and 90 degree turns, and has a bunch of sounds. Expect to hear Photon exclaim happy or angry emotions, copy a few animal noises, and even have sound effects to add to different situations. It is controlled by the app named Photon coding, through a Bluetooth connection. It is coded using badge coding, block coding, and can even advance into Scratch and Python.

Photon comes with various auxiliaries: Kits, lesson plans, and a demarcated working area mat with 30x30cm blocks. Priced at about R6000, Photon is quite heavy and expensive.

In comparison to the mBot, for us a more familiar counterpart, Photon has an active speaker that can do voice recordings. The robot also has sensors that are different, including a touch sensor, and sensors that allow responses to loud sounds like claps.

Scotty Go!

"Scotty Go is so cool!", Jody exclaimed.

Jody always loves the unboxing of new tools. With Scotty Go!, the action of taking out all the command cards was already a learning experience, because it required classification to go into the box layout.

Scotty Go! is a tangible block coding kit with puzzle pieces like we have come to know through *Tanks powered by Tangible.* It is aimed at players of six years and older. It comes with a cardboard field that limits the size of the code, thereby encouraging concise coding. Scotty is an alien who has to fight and avoid his enemies, the other robots. It can also turn into other characters like the panda, pangolin, cat, dog, penguin and koala. It works with a licensed app Scotty Go! Edu. You buy the box and receive the license key for one tablet, making the robot quite expensive.