RIGHT
RIGHT SKILLS FOR THE RIGHT FUTURE

RIGHT PILOT REPORT

Race2Zero an Enterprise Game

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Interreg North Sea Region RIGHT European Regional Development Fund
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Content

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1.0 Introduction

Developing a Culture of Enterprise in fife region is a key strategic aim for the Regional Authority and the Culture of Enterprise programme, run by Fife council's economic Development team has been in place for a number of years. They key objective is to create the entrepreneurs of the future by embedding business skills in young people. This is achieved through creating closer partnerships with education and industry and the RIGHT project gave us an excellent for collaboration and the opportunity to try something new. We were seeking digital solutions at a time when the Corona virus pandemic was creating barriers to delivery of pilots, so we decided after discussions with Economic development, to explore the creation of a digital learning tool. A digital enterprise game was in place for secondary education but there were issues with accessibility and some of the technology was outdated. Our discussions began about using RIGHT funding to create a new updated Enterprise game began.

Race 2 Zero is aimed at High School Students aged 12-16, this game is designed to introduce students to the concepts of Net Zero and Carbon Neutral ways of running a business but also the opportunities for progression into careers within the Blue Economy and Green agenda within business.

It is available on the App and Play Store, is free to play and used Augmented reality in a simulated Environment,
The game asks the young people to make a sequence of decisions, which takes their community to a Zero Carbon energy use, happy population, as well as being economically stable. Each session is approximately 40 minutes, ensuring it fits within class time.

It is designed to be as accessible as possible so that it could be used on most mobile devices and this gave us the opportunity to use Augmented reality to bring the game to life. This had been done previously for Fife's tourism section with the popular, In the footsteps of kings App and we sought to build on that.

The concept of an enterprise game based on the theme of running and transitioning an energy company to Net zero came about from joint discussions between Economic Development and Employability teams and we decided to identify a supplier.

2.0 Regional Strategic Context

Our research in work package 3 identified that our region had lower levels of entrepreneurship compared to other regions of the country and this is reflected by the lower rate of business startups than the national average. Some possible reasons cited were long term attitudinal barriers to entrepreneurship based on lack of financial and business confidence and lack of awareness of business concepts. Fife council have identified this a as a priority for economic growth and improved Entrepreneurial awareness and skills among young people is a key aim for the region. The Culture of Enterprise programme, run by Invest Fife aims to achieve this by creating closer links between education and industry which and there is a synergism with what we are trying to achieve with RIGHT pilots where we try to address skills as barriers to innovation, specifically:

1) Improved partnerships amongst the triple helix.
2) Improved awareness of Local Labor market in a blue economy context.
3) Addressing long term attitudinal barriers to entrepreneurship, lack of confidence.

In addition, there were two main reasons why we decided to create the Race to Zero game as a RIGHT project pilot. Firstly, we were experiencing a nationwide lockdown that was preventing us from being able to run face to face pilots. The situation was unclear, and this led us to look at alternative delivery models and alternative pilots. Secondly, and for the same reason we knew that schools were desperate for digital learning tools with many students studying from home this meant that we could create something that would assist educators as well as meeting key educational priorities. We could see the potential for links to the curriculum for excellence, skills for climate emergency and the STEM progression pathways so we realized we could create a pilot that was not only very useful in our own local context, but also would be completely transferrable and useable by other regions in the RIGHT project. It was also, for Glasgow the year of COP 26 so thematically it seemed a good fit on the national level.

3.0 About the Pilot

3.1 Description

The Enterprise Game was originally a physical board game that was loaned out to schools via delivery of the Culture of Enterprise program. The board game was developed into a digital enterprise game which was subsequently installed across all Fife Council Education computers to be accessed by pupils in schools. The game features local businesses and the aim of the game is to simulate the running of an enterprise through trade with other companies, managing risk and finances in order to make the company as profitable as possible. Similar to Monopoly, players were be dealt 'Happening Cards' which may offer a cash reward, insurance or a fine/penalty to imitate the unpredictability of running a business.

It was felt that this needed to be updated as some of the graphics of the game were out of date and it could only be used on fife council PC's. We wanted to create something that could be used on mobile devices. We decide that if we could make the new game sit within the context of the energy transition and Scotland's target of net zero by 2045 then we could create something fun and really engaging but also delivered a strong and serious message.

In the game users can play as an individual o a s part of a group session where they can compete against their peers. They begin as the CEO of an energy company selling energy to businesses within the local town which is represented in 3D as an Augmented reality projection that updates in response to the changes of the user. Within the game users will learn about the choices in economics and also the technologies of energy production, saving and storage and how this can impact local communities
Users start with oil powered energy production and a generally happy population. However, the townspeople would like to see change and that's where the user comes in come in! Over the course of the game which runs from 2010-2045, users will have to make a series of choices about investing in new technologies and will have to make economic and business decisions based on this. The game also has an element of randomness through 'chance cards' and these can be both positive and negative and

reflect the uncertainties that can affect business and communities in both the business and environmental contexts. When researching a new or the next level of technology the game is interspersed with Augmented reality STEM puzzles themed to the technology and the aim is to promote STEM learning. If users make the wrong decisions their score will be affected and in some cases their company will lose too much money, they cannot operate. At the end of the game users are scored on three metrics., Carbon Emissions, Finance and happiness and will be able to compete against their own score or compete with classmates if in a group game setting which should make the game more repayable and competitive and gives the potential to scale this up in terms of competitions between schools or even among partner regions within the RIGHT project.

3.2 Results/Outputs

This is difficult to measure at this point, but the spirit has been good pilot project evaluation has not been completed but it looks like it will be positive, there have already been a number of key achievements for us:

Stronger Links with Fife Council Economic Development team have been achieved and we are seeing much more collaborative working between our sections due to the excellent working relationships that have been built. Our teams have a much better understanding of each other's strengths and capabilities, and we actively seek opportunities to collaborate on programmers. Our other pilot, The Blue Consortium has given the perfect platform to facilitate these stronger collaborations and new programmers such as Project Nautilus, our school windfarm project has been made possible largely down to these relationships that have been built through the development of the game. This is a huge positive for us and in the long terms should help improve the overall innovation ecosystem for skills development.

The game has also shown that it gives students the ability a chance to engage with Net Zero/Carbon Neutral policies and see what kind of career paths may come has been viewed as largely positive. Testing has been done with a focus group of young people from St Columba's High school in Dunfermline enabled us to send feedback to the developers this has been done on several occasions. It has been a largely positive experience and the developers and Project Team have been impressed by how quickly the young people have engaged

'One student made a profit of 262 million pounds.... with a giant leap in decarbonization and top marks for a happy society! Certainly, a candidate for young enterprise student of the year award in the future!' **Liam Mason Project Officer, RIGHT**

3.3 Expected Outcomes

We expect that there should be a range of positive outcomes, new partnerships and new interactions on the back of our consortium activity. We aim to translate these into stories that highlight the strengths and potential for Fife to become a regional Hub for Blue growth. We hope to achieve some or all of the below:

Objective (From Pilot Methodology)	How was it Realised?
Better Awareness of The Blue and Energy Sectors in the local economy	By featuring local Blue Sector companies + educational and training opportunities via link to marine.traning.eu
Awareness of Job and career roles in the Blue and energy sector Awareness of training opportunities – link to marinetraining.eu (transregional pilot)	Link to marine.traing.eu -other pilot mapped out all courses from vocational to masters level in our regions. This will be incorporated into the game to highlight career pathways.
Understanding of innovation and how this can be applied and commercialized	The game encourages users to make the correct choices for Research and Development of new technologies. Players will gain an idea of how investment and new technologies change markets.
Stronger partnerships between education, SMEs, and the regional authority (triple helix)	By Co -Developing the game with end users, local companies and colleagues in Culture of Enterprise we have achieved a good level of engagement across the triple helix.
Focus on the importance of sustainability in green recovery.	Along with the objective of Running a successful enterprise and making profit, users will have to transition their energy production to Net Zero by investing in new tech and energy saving methods such as insulation + storage to be successful Otherwise their town will become unhappy and ultimately, will not profit.
Displaying digital technologies such as augmented reality, inspiring digital skills and awareness of technology among young people.	The Game users VR to project a digital town that changes in relation to user interactions. This showcases what can be done with Augmented reality and how data can be visualized
Awareness of interconnectivity of sectors, economy as an ecosystem, connectivity between land and sea, supply chains, value chains.	The game focuses on the wider economic ecosystem of a town, the concepts of supply and value chains are featured in the random chance element. The interconnectivity is shown through changes to user actions.

4.0 Conclusions

CHALLENGES

The Development of the Race to Zero game as a RIGHT project pilot proved to be difficult due to a number of internal factors. Fife council's own procurement policy requires that for IT projects our Business Technology solutions section, BTS must project manage all IT projects, and this meant that a number of processes and procedures had to be followed before we were allowed to seek a supplier. This added a great deal of time to the development of the app as various stages had to be completed and fulfilled. Although this meant that our processes were robust it delayed us going to procurement by 6 months. Had this been known to us when we decided to proceed with the pilot we would not have progressed with the concept as a RIGHT pilot. Sometimes it felt that time that could have been better spent on other activities such marketing, testing and content development was tied up in following process. At one stage we had to wait on a project manager being assigned, we had to wait on the project being given priority to proceed as well as progressing a series of 'gate reviews. At times it was difficult to understand these processes and more needs to be done, jointly among the various sections of Fife council to improve this. This is one of the big lessons learned from the Race to zero pilot and is perhaps a message that is also relevant to other project partners.

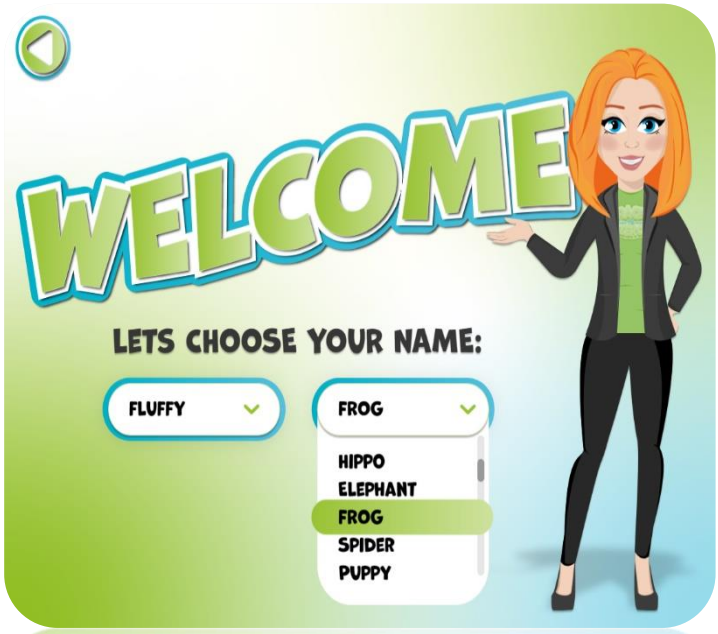

Figure 1 students do not record personal data but are identifiable by avatars

Security Concerns

With Race to Zero being designed as an educational tool for 14–16-year old's there were concerns regarding data security and how we would avoid any risk to pupils. For us this was a fine balance as we wanted the app to utilize metrics that allowed a competitive element where they could compete against their classmates or try to beat their own score. It was felt that this would make the game more fun, engaging and re-playable as well of being of more use in an educational setting.

There was real 2 main concerns, 1) holding data on pupils and the requirements for management of the data and 2) protection from anonymous users. Both of which are significant risks and we needed to satisfy all stakeholders that this could be managed. From previous experience we knew that it would not be possible, under the constraints of time and the budget that we had available to hold and manage specific data on school pupil's but we felt that there was a workaround that could be found.

An innovative solution was found that could be used that would enable us to meet our objectives of keeping the competitive gamified element while minimizing data risk. By allowing random anonymous names (see figure above) we could allow users to be identifiable by their peers, or by teachers as this would allow for a competitive element that we wanted to achieve. For group games one user, a teacher in a classroom setting, would generate a code that other users could use to access a game. In this way we would allow for the competitive element in the classroom by enabling the comparison of scores without holding and personal data. This solution was found to satisfy our process and allowed us to proceed in the development.

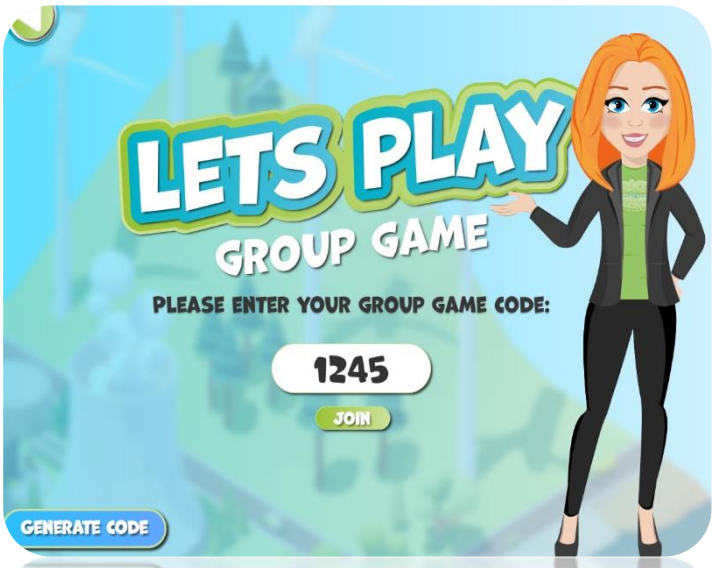

Figure 2 group games facilitated by join code

OPPORTUNITIES + NEXT STEPS

A benefit to the approach taken to co-design the game with key people in education such as the Developing the Young workforce, and curriculum managers has meant that we have been able to create a tool that they can use that will work towards a number of key educational objectives. Learning can be directly linked to Education Scotland Curriculum for excellence (CFE), STEM and Progression in ICT (see annex). A key next step will be to evaluate the effectiveness over the course of the academic year in a learning context. A lot of planning and preparation as gone into getting this right, so we hope that we achieve the results that we have set ourselves. There is potential if successful for developing Similar Enterprise &net zero games for other age groups, One for younger primary age and also for further and higher education levels. We intend to engage with other RIGHT partners such as St Andrews university and Fife college via the Blue Consortium to Develop these.

Our Team would also like to share pour experience in the spirit of ongoing Interreg participation to allow partners to use the app in their own region and potentially, to adapt to suit their own regional priorities. Although Interreg RIGHT is finished there are still ways for us to collaborate without funding and our Fife Region would very much like to do so.

5.0 Outputs for new strategy and policy for Skills education and SME innovation

The experience in developing the app and the feedback received from young people and educators gives a strong indication that there is a demand for tool such as these to be deployed in an educational setting with a focus on entrepreneurial and digital skills. A key recommendation would be that in Fife region **fully embed enterprise and Innovation skills into curriculum for school delivery.** Through tools such as the Race2zero game these long-term challenges and lower than average levels of entrepreneurship can be addressed

In a similar vein, fife council should see **More opportunities to embed net zero, green shift and energy transition themes into mainstream education.** Tools such as Race2Zero present a good opportunity to do so, and we should build on the success of this pilot in realizing educational goals around environmental education sustainability and the circular economy.

Race to Zero and other projects focused on Net zero and the energy transition should be **Used as part of the developing the young workforce fife brief to enhance uptake in STEM activity**, Overall, a greater focus on STEM and more creative tools to engage STEM learners. Findings from our work with our other RIGHT pilot the Blue consortium, employers and educators both tell us that more STEM based interactions are needed and new ways are required to encourage different demographics into STEM based careers. Tolls like Race2Zero are a positive step in this direction.

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6.0 Potential for upscaling/learning Transfer/Internationalization

The Race2zero game was designed with accessibility and transferability in mind. We wanted to create a tool that is easily useable in other Regions of Interreg and beyond. Our goal for the game to be a long-standing output and legacy of the RIGHT project for Fife but also for the project as a whole. The game is available for free on Google and app stores so anyone can download and use it. Although our primary target is school pupils and educators it is free and available for anyone to use, and we very much hope that this happens. It is a fun and engaging tool that has been well received so far by all and feedback thus far is that it presents some very relevant and complex themes around the energy transition, sustainability and corporate responsibility in an innovative and engaging way. We know from research in other regions that enterprise skills are a priority area for education so there is possibility for many synergies to be found.

Our methodology, project plans and specification are also available in the appendices, and we are happy to share our experiences if partners wish to replicate in their respective regions or to amend to make it more localized and feature local businesses. The Game Developer, Harmony studios are very capable and committed partner and we would highly recommend to other Interreg partners. Beyond the life of Interreg RIGHT Our project team would be willing to collaborate wherever we can and explore any opportunities for cross regional development. There are discussions ongoing about creating future versions of the game aimed at higher and further education levels and this could present the ideal opportunity to do this and build on the work and knowledge of RIGHT.

culture *of* enterprise

Making Fife more enterprising™

Can you get your town to be Carbon Neutral as quickly as possible whilst still keeping an eye on your spending?

Race to Zero is a fun packed app with a serious message - a great tool for learning about spending, investing, innovating and production.
Simply tap and swipe your choices to see if you can make the best decisions to achieving a carbon neutral town.
Within the game you will learn about the choices in economics and also the technologies of energy production, saving and storage.
You start with oil powered energy production and a generally happy population.
However, the townspeople would like to see change and that's where you come in!

Exciting App Features

- Plan your Spending
Buy, Invest, Research and Sell to get the optimum outcome to your Race to Zero Carbon.

- Augmented Reality STEM Puzzles
Games against the clock appear in your World - can you fix a circuit board? make the optimal wind farm? fix the water generator?

- 3D Town in AR
Watch your animated town advance as you evolve the energy use.

- Choose your name and see your team
Select a fun name from the drop down lists and see which of the 4 Scottish themed teams you are assigned to.

- Hundreds of Chance events
Sometimes good, sometimes bad - the road to success is never predictable.

- 30 minute gameplay
Manage a budget over 4 decades in just 30 minutes - can you beat the politicians to Carbon Zero?

- Group Play
Share your special code in the classroom or at home to include friends and colleagues in a group game.

- Review your Stats
After every game, see your activity in graphs and review your choices - can you beat it next time?

This app is a free, family safe digital product and there is:
- No In-app Purchasing;
- No Advertising;
- No Registration;
- No Personal Data Recorded.

The aim of the product is to provide supplementary learning on economics and increase environmental awareness in a fun, engaging way.

7.0 Footnotes

1. Fife's Economic Strategy 2017 – 2027 available at
https://www.investfife.co.uk/wp-content/uploads/2021/07/fifes-economic-strategy-2017-27.pdf

2.Plan 4 fife 2021 -2024 available at
https://our.fife.scot/plan4fife/plan-for-fife-2021-24

3. Curriculum for Excellence – Scottish government

https://education.gov.scot/documents/All-experiencesoutcomes18.pdf

4. Skills Development Scotland Skills for climate Emergency Action Plan 2020-2025

https://www.skillsdevelopmentscotland.co.uk/media/47336/climate-emergency-skills-action-plan-2020-2025.pdf

5.0 Culture of enterprise action plan

https://www.investfife.co.uk/who-we-are/culture-of-enterprise/

8.0 Annex

Annex 1 Race 2 Zero Project Plan

Annex 2 ESA Functional Requirements

Annex 3 Race 2 Zero Resource Pack

Annex 4 Developing the Young Workforce Career Education Standards

Annex 5 Fife Progression in ICT (PICT)