



Serious game: SKILLS IN THE WIND ENERGY

SECTOR

(Trivial: SKILLWIND)

2015-1-ES01-KA202-015935

Main partner:



Funded by:



Co-funded by the
Erasmus+ Programme
of the European Union

Partners



The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.



Serious game: SKILLS IN THE WIND ENERGY SECTOR (Trivial: SKILLWIND)

2015-1-ES01-KA202-015935

Trivial: SKILLWIND is a project funded by the Action "*Strategic Partnerships*" of the *Erasmus+ Programme* of the European Commission, specifically by the KA2: "*Cooperation for innovation and the exchange of good practices*"

The consortium is composed of five partners from four European countries with an extensive experience in the vocational training of this sector and in the development of European and National Projects

- **AEE** (Spanish Wind Energy Association): *Spain*
- **SGS TECNOS** (Multinational Company): *Spain*
- **ANEV** (Italian Wind Energy Association): *Italy*
- **BRUNEL UNIVERSITY LONDON** (University): *UK*
- **WindEurope:** (European Association of Wind Energy) *Belgium*

The Trivial: SKILLWIND's objectives are:

- To standardise at European level the NECESSARY SKILLS TO ADEQUATELY QUALIFY WIND INDUSTRY PROFESSIONALS, SPECIALLY THE CAPABILITIES OF WORKERS RESPONSIBLE FOR THE OPERATION AND EXPLOITATION OF WIND FARMS.
- To promote the development of innovative training in the wind power sector through the design and programming of a SERIOUS GAME FOR THE INDUSTRY. This training will be specifically aimed to solve the most critical aspects of the activities of Maintenance and Health and Safety needed to create a safe working environment.
- To promote the PROFESSIONAL DEVELOPMENT OF WORKERS AND THE COMPETITIVENESS OF THE INDUSTRY.

TRAINING CONTENTS SHAPING UP

The last contents of Skillwind project are being polished before their publication in the webpage. The Skillwind consortium is working in the training modules of Maintenance, and they are now developing the last two modules on “predictive services” and converters”. The contents of the training paths are as follows

TRAINING PATHS	3
PATH #1. WIND FARM O&M TECHNICIAN	4
1.1. Main criteria of maintenance planning.....	5
1.1.1. Lesson 1: General presentation	5
1.1.2. Lesson 2: Maintenance program.....	9
1.2. Predictive maintenance	14
1.2.1. Lesson 1 – Introduction to Predictive maintenance.....	14
1.2.2. Typical predictive activities.....	17
1.3. PREVENTIVE MAINTENANCE	28
1.3.1. Lesson 1 – Introduction to Preventive maintenance.....	28
1.3.2. Lesson 2 – Preventive tasks	33
1.3.3. Lesson 3 – Drive train	38
1.3.3.1. Preventive maintenance within the drive train	38
1.3.3.2. Main shaft preventive maintenance	39
1.3.3.3. Gearbox	45
1.3.4. Lesson 4 – Blades & Pitch	49
1.3.4.1. The tasks needed to accomplish the preventive maintenance within the blades	50
1.3.5. Lesson 4 – Yaw System and brake pads.....	56
1.3.6. Lesson 5 – Hydraulic system	62
1.3.7. Lesson 6 – Electric, sensors and control system.....	67
1.3.8. Lesson 7 – Generator	69
1.3.9. Lesson 8 – Ground line & lighting protection.....	79
1.3.10. Lesson 9 – Power cabinet.....	80
1.3.11. Lesson 10 – Converter	81
1.3.12. Lesson 11 – Tower & Foundation	84
1.3.13. Lesson 12 – Reporting and Check Lists.....	88
1.4. CORRECTIVE MAINTENANCE.....	89
1.4.1. Lesson 0 – Introduction to Corrective maintenance	89
1.4.2. Lesson 1 – Communications and Network	91
1.4.3. Lesson 2 – Electrical corrective maintenance	97
1.4.4. Lesson 3 – Mechanical corrective maintenance	99
1.4.5. Lesson 4: Rotor and blades	104
1.4.6. Lesson 5: yaw system.....	107
1.4.7. Lesson 6: Platform, Tower and foundations	111
1.4.8. Lesson 7 – Fault finding practices.....	114
<u>PATH #2. BLADE SERVICES TECHNICIAN</u>	<u>126</u>
<u>1. BLADES INSPECTION</u>	<u>127</u>
<u>1.1. DAMAGES EVALUATION</u>	<u>127</u>
<u>1.2. INSPECTION PROCEDURE.....</u>	<u>130</u>
<u>2. BLADES REPAIR</u>	<u>131</u>
<u>2.1. INTRODUCTION.....</u>	<u>131</u>
<u>2.2. BLADE REPAIR ZONES</u>	<u>132</u>
<u>2.3. REPAIR PROCEDURE</u>	<u>133</u>
<u>PATH #3. PREDICTIVE SERVICES TECHNICIAN</u>	<u>138</u>
<u>PATH #4. CONVERTER.....</u>	<u>138</u>

THE SERIOUS GAME APPLICATION IS ALMOST FINISHED

After several beta versions, the Serious Game application has finally reached its final design steps to be played in any mobile device. For now, it is only downloadable for android devices as to upload every version in the Apple store is costly. But it is scheduled that after the perfect design is achieved for Android operating system, Brunel University would develop the iOS version.

Three different game modes have been implemented and now the game could be played in novice, expert and master level. The app offers the possibility to play each subject separately and consequently progress individually or play as a random trivial so the application chooses directly the subject to test.

In the main start screen the total score obtained by the user is shown and touching the “Check out your achievements” in the menu all the levels passed from every subject are presented. Furthermore, every little wind turbine drawing in each of the subjects gives a general insight of the total achieved levels in that subject.

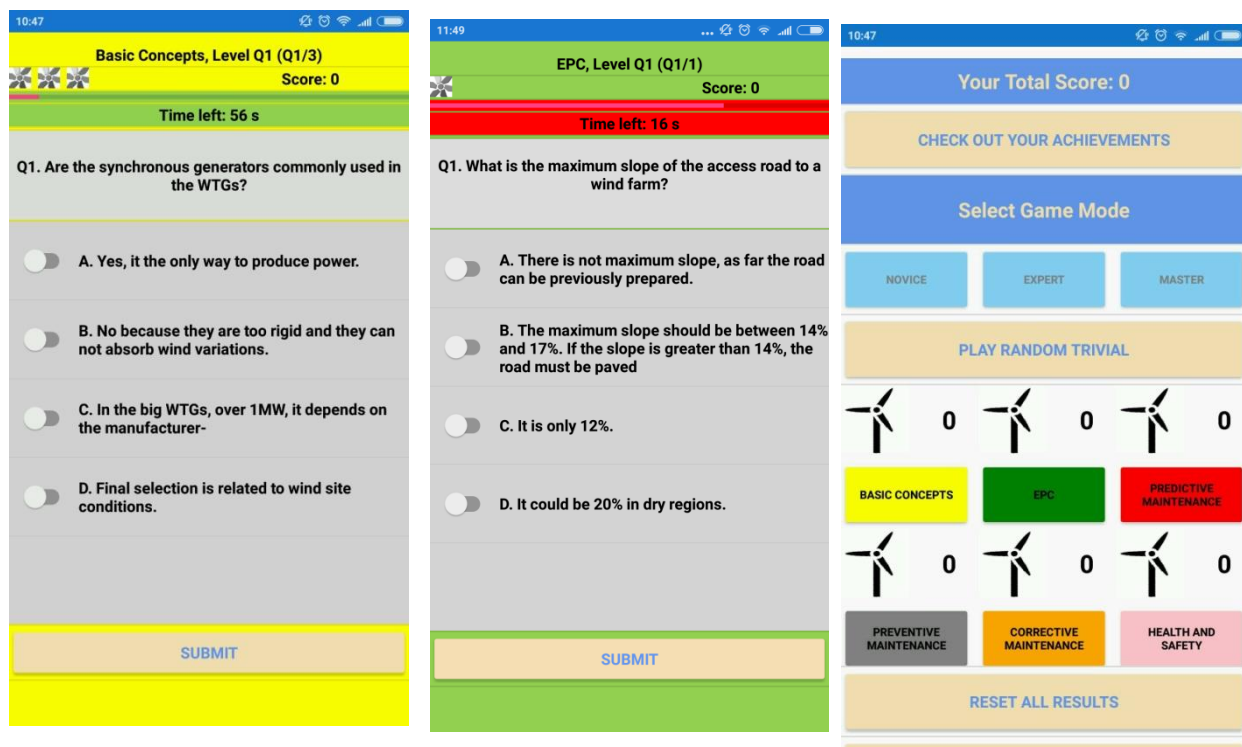


Figure 1. Some screenshots from the Serious Game current state

In addition, as some of the questions have pictures and require a perfect visibility of these ones, a double zooming has been introduced. So the user would be able to have a first zoom of the image by clicking on it with one finger and if needed it offers the possibility to pinch with two fingers and enlarge the pictures even more and move the picture in the screen to the point of interest.

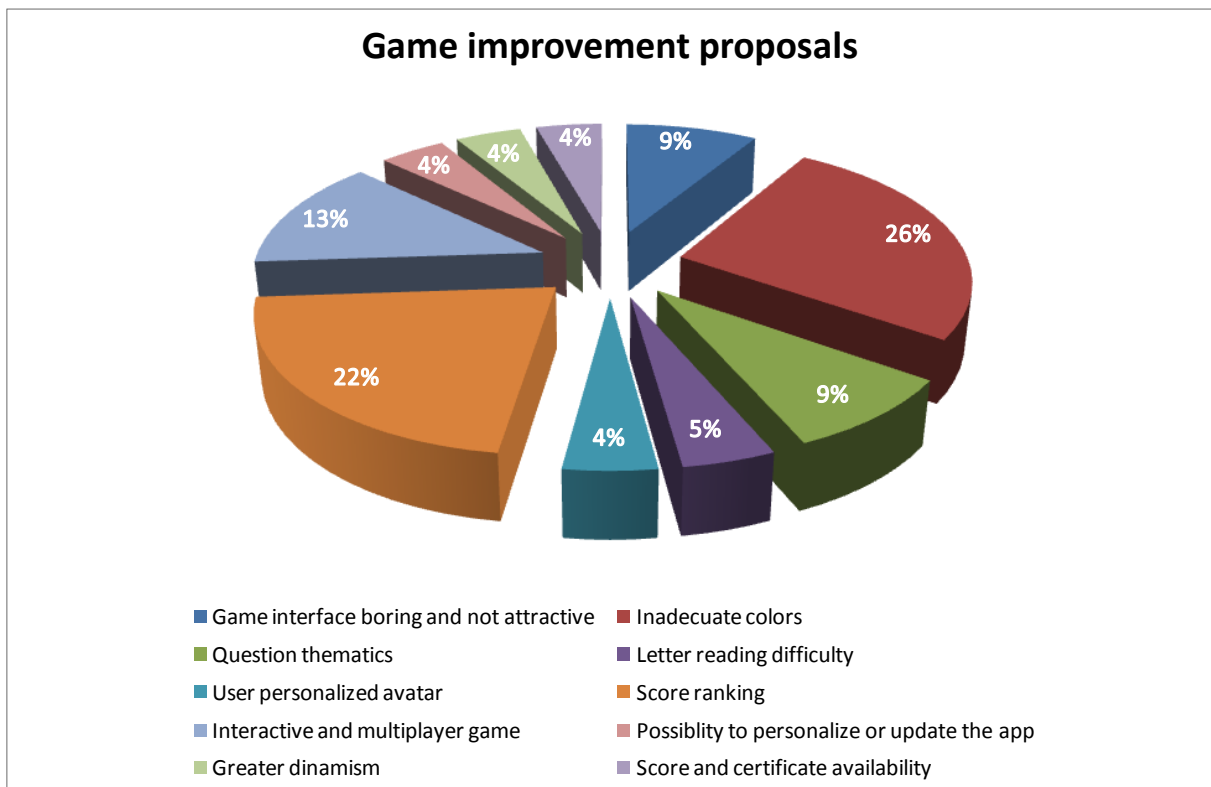
PILOT TESTS OF THE TRAINING PROGRAM HAVE JUST STARTED

AEE has been the first one to present and test the training program with the end users and stakeholders. The 12th of July they organised an event at their headquarters in Madrid where they showed and tested the app and also requested feedback for improvements to the attendees.



Spanish Pilot Test Meeting

The participants took part in a debate providing with very interesting proposals to improve the Serious Game and they also filled a quiz with their impressions of the app. This feedback has been compiled and so far, 75% of the attendees said that the Serious Game graphical interface is attractive and only 12% considered the game dynamic to as not attractive. Some of the main proposals arisen during the Pilot meeting are showed in the following chart.



Spanish Pilot Meeting proposals arisen in the debate and quizzes

All the information obtained in the Spanish Pilot meeting will be compiled with the feedback given in the rest of pilots so the final version of the Serious game would include most of the improvement proposals in its final version.

NEXT STEPS

- ANEV, Wind Europe and Brunel University of London are currently organizing their Pilot test meetings.
- After all the information obtained in the Pilot meetings is compiled, improvements are to be implemented in the Serious Game so the quality of this output is the best as possible.
- The game app will be translated from English into the other languages of the consortium.
- All the partners are looking forward to the National Info days that in most of the cases will take place in September 2017 in each participant country.
- The final European multiplier event will be held in Brussels on the 4th October 2017 to disseminate the project at a European level. The last project transnational meeting will be held the day after the multiplier event.

More information:

Periodically, AEE will send newsletters as this describing the different stages and updates of the project.

However, if you wish, you can check the updated information on the website: <http://skillwind.com>

Also, in the social networks:

https://twitter.com/skill_wind

<https://www.facebook.com/skillwindgame/>

Should you wish not to receive further information regarding this Project, please let us know by sending an email to: info@skillwind.com