



# PROJECT WEEK REPORT

3rd project week | 29 – 31 October 2019 (ATEC,  
Portugal)

## ABSTRACT

Because of the growing digitalisation of the society and industry there is a growing demand for people with programming skills. The micro:bit system is an accessible and easy to use educational tool to make interested people familiar with the basics of programming, while students develop additional soft skills.

## QUALITY CATEGORY

- Guidance
- Learning
- Examination

## QMS4VET Consortium

The partners within the QMS4VET project are:

- Aventus ([www.ventus.nl](http://www.ventus.nl))
- ATEC ([www.atec.pt](http://www.atec.pt))
- BBS Syke EUROPASCHULE ([www.bbs-syke.de](http://www.bbs-syke.de))
- bit Schulungcenter ([www.bitschulungcenter.at](http://www.bitschulungcenter.at))
- West Lothian College ([www.west-lothian.ac.uk](http://www.west-lothian.ac.uk))
- Kainuun ammattiopisto ([www.kao.fi](http://www.kao.fi))

## INTRODUCTION

A TEC is a private Training Academy certified by ISO 9001:2015 with its headquarters located in Palmela, south of Lisbon, and with a delegation in the North region of Portugal in Matosinhos, Porto. A TEC is focused in providing EQF level 4 and 5 technical vocational training to young people and adults, and also to employees from companies that select A TEC as their training provider.

During QMS4VET third project week, A TEC put together a team of colleagues and students from the Robotics and Mechatronics areas to introduce the Project Week Participants to the micro:bit teaching approach (see [www.microbit.org](http://www.microbit.org)).

For more information about the QMS4VET project and other project week reports see [www.ventus.nl/qms4vet](http://www.ventus.nl/qms4vet)

## OBJECTIVES

The following objectives were set for best practice with respect to A TEC's micro:bit education program:

Ensure that:

1. Awareness, interest and basic skills are created in programming;
2. Attractiveness of their educational programmes is improved;
3. Soft skills through team learning is improved.

## METHODOLOGY

The overall aim of A TEC's micro:bit education program is to include computer programming in their curriculum. This element of the total curriculum is organised in a special Creative Lab, a classroom with computers and relevant hardware. A mentor/coach delivers tasks/assignments to the students which they have to undertake individually or in (small) teams.

In order to ensure the overall aim, the following objectives have to be met:

### 1. Create awareness, interest and basic skills in programming

By using the micro:bit system in the education program, students are confronted with programming assignments with increasing complexity. The micro:bit system ensures a user-friendly methodology to achieve these objectives and enhance logical thinking skills.

### 2. Improve attractiveness of their educational programs

The micro:bit system ensures an attractive, practical, learning by doing methodology with visual tools (drag and drop) to build a program. Practical work is motivating because the students can see the immediate results of their efforts.

### 3. Soft skills through team learning is improved

This is achieved through an informal and interactive learning environment, which means that certain tasks/assignments have to be undertaken in small groups which stimulates the reinforcement of soft skills like cooperation, communication, creative thinking, problem solving and team building.

## SWOT ANALYSIS

The following analyses the Strengths, Weaknesses, Opportunities and Threats (SWOT) of ATEC's case study.

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• Fun and engaging</li> <li>• Clear immediate results – instant feedback on assignment</li> <li>• Inexpensive resources</li> <li>• Intuitive learning</li> <li>• Simple and easy to understand (non-technical people)</li> <li>• Applicable across all curriculum areas</li> <li>• Contemporary and relational to young people</li> <li>• Practical, hands-on learning</li> <li>• Easy route into STEM engagement</li> <li>• No language barriers</li> <li>• Increase knowledge of English</li> <li>• Basic learning skills required (no previous experience)</li> <li>• Diverse range of learners and providers</li> <li>• Lots of additional affordable hardware available</li> <li>• Lots of example programmes available</li> <li>• 'Plug and play' and open source</li> </ul>	<ul style="list-style-type: none"> <li>• Needs practical demonstration to engage users</li> <li>• Knowledge depth is limited</li> <li>• Teaching staff need to be knowledgeable, flexible and engaged</li> <li>• Extra attention necessary for connection with social/soft skills</li> <li>• Preparation time required for teaching staff</li> <li>• Restrictive tech – large gap between learning environment and industry</li> <li>• Over-simplification limits programming connection with technology</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• Introduce coding to young people over 5 years old and increase number of future students in STEM field</li> <li>• Start-ups, for example sell services</li> <li>• Promoting VET-school marketing – co-operation with other schools</li> <li>• Good marketing tool – attract wide variety of learners</li> <li>• Promote distance learning and independent learning</li> <li>• Opener to learn another language or even coding languages like JavaScript</li> <li>• Filling future market demand for coders</li> <li>• Address gender balance in STEM subjects</li> <li>• Upskill teaching staff in non-technical areas</li> <li>• Introduce use of technology into broader curriculum</li> </ul>	<ul style="list-style-type: none"> <li>• Product becomes obsolete if Microsoft withdraws from project</li> <li>• Difficult to hire staff to teach classes (unpaid prep time)</li> <li>• Unwillingness of teaching staff to create new curriculum and resources, to engage and to teach</li> <li>• Dependent on creative thinking to embed into curriculum</li> </ul>

### Reflection and awareness on possible weaknesses and threats

In the preceding SWOT analysis an overview was given of the Strengths, Weaknesses, Opportunities and Threats of ATEC's programming/coding education programme. In the following section, the strengths and opportunities are integrated in a Step-By-Step Implementation plan which can be used in implementing all or parts of the system. However, in doing so, it is important to be aware of the weaknesses and threats of ATEC's programming/coding education program. Therefore, in the following paragraph a reflection

can be found on the main and most important potential weaknesses and threats based on the results of the SWOT-analysis. This reflection serves to inform potential users of some vital basic steps to put in place when considering implementation of all or part of ATEC's micro:bit programming/coding education program:

1. Allocate the necessary resources to guarantee successful practical demonstration of the program.
2. Integrate micro:bit in an initial stage of the training program to engage students into the programming/coding learning activities and make sure to complement it with real life industry technology.
3. Use micro:bit as a basis to integrate different learning subjects, including soft skills like English language, communication and/or team work.
4. Develop your trainers to use micro:bit to its full potential (use micro:bit website) and to use it integrated in the training program, including the validation of the learning outcomes.
5. Make sure you are not over dependent on one single technology to develop your training program.

## RECOMMENDATION FOR STEP BY STEP IMPLEMENTATION

The following recommendations can be used when implementation of all or parts of the ATEC's programming/coding education program is considered.

### 1.1. Step 1 – Gathering information

- Study the micro:bit website <https://microbit.org>
- Carry out a workshop at school that is using micro:bit in education

### 1.2. Step 2 – Planning and Piloting

- Assign the project leader
- Prepare a business plan outlining your intentions/ goals, budget, resources and facilities
- Promote the micro:bit learning system in your organization and find the early adaptors
- Let early adaptors start a pilot with early adaptor students
- Evaluate the pilot

### 1.3. Step 3 – Incorporate into curriculum

- Prepare an implementation plan including intentions/ goals, budget, resources and facilities
- Incorporate the early adaptors in the development of the curriculum
- Develop curriculum according to intentions/ goals

## EVALUATION

After analysis of ATEC's programming/coding education program the following conclusions can be drawn:

### Advantages:

By integrating the micro:bit programming/coding education program in their curriculum, ATEC has found a low cost and effective solution for raising awareness, interest and basic skills in

programming/coding, improving the attractiveness of their educational program and stimulating the learning of soft skills.

**Disadvantages:**

Although the implementation of the micro:bit method does not require huge amounts of money, it is good to realize that it needs investments in staff to get familiar with the system and create curriculum. Next to that the micro:bit methodology is suitable for basic programming/coding education, but not for more sophisticated/ industry standard requirements.

**Tips for implementation:**

Study the [www.microbit.org](http://www.microbit.org) website and visit an education centre which already works with the system to get hands on experience. Make a business plan, organise a pilot phase, evaluate, make an implementation plan, implement and evaluate.

## APPENDICES

1. Agenda and Minutes 3rd QMS4VET project week
2. ATEC presentations