

EasyICT: A Framework for Measuring ICT-Skills of People with Cognitive Disabilities

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Abstract. Over the last decade, the basic skills to operate a computer (ICT skills) are an essential requirement to participate in the current digital era. People not possessing these skills are likely to miss access to education, entertainment, business and social life. In particular for people with cognitive limitations, this is a real threat. In the EasyICT project, we aimed at the development of a training and assessment framework, supported by an on-line tool. Using this tool youngsters with mental disabilities can be systematically tested for their ICT skills. As a result, they receive a report and additional training material in order to improve their skills.

1 Introduction

Over the last decade, ICT has become an essential part of our daily life. Hence, not being able to operate a computer takes away the chances to participate in this new digital society. This is in particular true for people with cognitive disabilities. Alternatively, making these new technologies available for those target groups, will contribute to full inclusion of these individuals in the contemporary society [1]. Several reports stress the impact on the social, economical and cultural development of different target groups when having internet connection *and* being able to use it [2][3]. Despite of the importance of possessing these ICT skills, there is almost no attention put focussing on methods for the acquisition and measuring of ICT skills by persons with cognitive disabilities. Hence, estimation of the needs is still purely empirical.

In our EasyICT project, we aim to address this problem. The goal is to formalise the process of training and assessment of ICT skills for the envisioned target groups. We focus on a very broad group of youngsters with cognitive disabilities between the age of 6 and 18. It is very important also to include those individuals who need full assistance to perform computer tasks.

Furthermore, in order to easily integrate the framework into existing educational systems, it is important that the realised framework fits into the different local European educational models and is compatible with the European Computer Driving Licence (ECDL) [4].

2 The Framework

In order to assess ICT skills, we categorised them in 4 main groups:

1. Managing the computer (identifying parts, handling mouse, ...)
2. Browsing the internet
3. Using e-mail
4. Using ICT to communicate in a safe, sensible and appropriate way

For each of these categories, the different aspects are identified. E.g. in the category ‘managing the computer’, one of the aspects is ‘hold the mouse steady’ or ‘click the mouse once’. Per aspect, several test questions are developed.

An assessment is always performed in one-to-one set-up with a tutor and one candidate. There is no time limit to complete an exercise or test. A test session, however, should not exceed one hour in order to avoid loss of concentration, but each test can be re-entered at any later time in case the candidate should lose their concentration.

Whenever possible, candidates are able to use their own familiar PC, but if for some practical reason a different PC has to be used, adaptations have to be made to come as close as possible to the familiar environment (system software, browser, adapted hardware, etc.).

In order to allow the test to bring a positive message to the candidate, the tutor will only select those tests that the candidate will most probably be able to answer. Immediately after the test, a certificate is provided for the candidate, listing all the skills that have been assessed positively. Keeping a positive message in mind, skills that have not been tested or achieved are not listed.

3 The Online Test Environment

3.1 Open Source Framework

Based upon the theoretical background and breakdown, acquired during the first part of this project, an online environment has been created. This environment is built upon a Dokeos e-learning platform [5]. The open source nature of this platform allowed us to easily add some additional functionality while removing other standard Dokeos functions. In order to give a reader an impression of the implementation issues, in what follows, we will shortly discuss some of those adaptations.

The final goal of the online test environment was to create a very easy to use tool for teachers in special education. Hence, all unnecessary functions were removed or disabled from the interface. Security of the children’s data is an important topic, but not at a cost of penalising usability. An issue rises specifically when a child moves to another class or changes to another tutor. The tool allows teachers to transfer children to their own class, but obviously we must prevent them from moving arbitrary students. The parents (or guardian) are considered as a trusted actor: in order to complete the transfer, the teacher needs a password. This password is printed on the certificate, which is handed over by the first tutor to the parents. They have to present the certificate with the password to the new teacher, who is instructed to change the password after the transfer is completed.

As stated before, another important requirement when dealing with children with intellectual disabilities, is that a tutor must be able to suspend a test at any arbitrary time when concentration of the candidate appears to fade away. Afterwards, at any later

time, one must be able to continue the test at the point where they left. Hence, when a test is restarted, previous results are automatically reloaded.

We are potentially dealing with an enormous number of candidates being tested; this was even the case in the pilot study that was running in five European countries. Therefore, in order to keep the number of students on the overview page reasonably small, teachers are able to deactivate one or more of their students. On the students overview page, only the picture of active students is shown. This means that a test can only be started for active students. A student, after being deactivated, can always be activated again. Typically, students that no longer need to perform the test are deactivated by their teacher.

Next, in the original Dokeos environment, scores were only shown numerically. Tailoring the interface more to the living environment of our target group, an extension has been made to visualise scores also in a graphical way, presenting a more attractive way to both teacher and student.

Finally, within the scope of the European partnership in the EasyICT project, the platform was also extended to allow each partner country to administer their own questions and students. This is an important feature request, as different countries may have slightly different questions and tests.

3.2 Test Questions

According to the test categories as described in Section 2, we identified three types of tests in the current pilot implementation:

1. Simulation test questions, including actions such as clicking and dragging. This test is performed in a simulation exercise (Flash).
2. 'In-application' tests include actions such as 'opening the browser', mostly performed by the candidate on their familiar desktop.



(a)



(b)

Fig. 1. (a)An example of a simulation question where the candidate has to drag the head of the cat into the right position. (b)Additional stimulating material for practicing moving the mouse, using the WAI-NOT website[6].

3. Finally, permanent evaluation tests are items that are observed during a longer observation period (e.g. appropriately handling the hardware).

Figure 1(a) shows an example of a simulation question, developed using Adobe Flash. Animations are made based upon drawings made by the children themselves. Animations and sounds are added in order to make it more attractive.

Finally, based upon the results of a complete test session, the candidates' profile is generated. In contrast to the report generated for the candidates themselves, this report is listing the acquired skills as well as the ones not yet acquired. Additionally, another report is generated containing a list of additional material that can be used for further development of the connected ICT skills. On the provided report, there is a list consisting of publicly available exercises that can be found on the internet, motivating the candidate and their tutor to start practicing on those particular skills (see figure 1(b)).

4 Conclusions and Future Work

In this paper we proposed the EasyICT project, an assessment framework and accompanying on-line assessment tool focussing on the assessment of the ICT skills of people with cognitive disabilities. As a result, the candidates get a positive report on their current skills, together with a personalised list in order to strengthen those skills. Currently a pilot test in five European countries is being performed.

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