Tablet Pilot Experiment in Spain

Comparative Study on Tablet Operating Systems

INTEF, Spanish Ministry of Education, Culture and Sports

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GOBIERNO DE ESPAÑA — MINISTERIO DE EDUCACIÓN, CULTURA Y DEPORTE

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INTRODUCTION

The pilot project conducted in Spain during the school years 2009-2010 and 2010-2011 (http://recursostic.educacion.es/eda/web/proyecto_eun/eun_inicio.html) involved the use of netbooks with 1:1 methodology to assess the impact of these facilities on teaching and learning processes.

As a continuation of the current initiative, it was proposed to conduct an assessment modifying the technology variable. To that end, it was decided to use the Iconia W500 tablets, provided by the manufacturer Acer and equipped with the Windows 7 operating system.

This pilot experiment, which has been under way in Spain for several years and is now focused on the potential of tablets, is framed within a European project developed by Acer and European Schoolnet, carried out in eight countries (http://1to1.eun.org/web/acer/tablet-pilot). The planned duration of this European project corresponds to the 2011-2012 school year (from January to June 2012). The final report drawn up by European Schoolnet will be available in September 2012.

This report includes a presentation on the pilot implementation of tablets in Spain from an organizational point of view, and a comparative study on different operating systems for the tablets in question.

PILOT IMPLEMENTATION IN SPAIN

OBJECTIVE AND PLANNING OF THE PILOT

This pilot aimed to explore the additional advantages associated with the use of tablets in the teaching and learning process, as well as in the daily work of teachers, in and outside the classroom, compared with the netbooks used in the previous pilot.

The educational project that each participating teacher designed had to include scenarios that explore the autonomy offered by of new devices (e-learning), that can be used in field research, new features like a touch screen, which facilitates screen sharing; a webcam that lets you add video captures or still images as part of new elements in e-learning, etc.

The distribution of tablets to the schools was organized by Acer and European Schoolnet to equip a classroom and four teachers who teach any subject to that class.

The following stages are foreseen throughout the project in Spain:

February	• Decision-making as to operating system
	• Familiarization with what an eTwinning project is
	• Designing the pedagogical scenario, completing the initial report approximately towards the end of the month
March	• Start of activities with the tablets in the classroom

	• Review of the initial plan proposed and developed with the necessary adjustments and amendments. These actions, scheduled for completion by the end of March, are reflected in the monitoring report
April	• Continuation of the classroom activities after implementation of the amendments
May	• Completion of the pilot and collection of results through the final report, surveys, etc.

PARTICIPATING SCHOOLS

The following criteria were adopted for the selection of schools in Spain:

- Participation in the pilot project with the netbooks
- Proven experience with the 1:1 type of pedagogy
- Pedagogical quality and variety of areas covered in projects developed with netbooks with 1:1 pedagogy

The selected schools in Spain are:

Autonomous community	School	Address
Aragon	IES Tiempos Modernos	C/ Segundo de Chomón s/n. 50018 Zaragoza
Castile and Leon	IES Tomás Bretón	C/ Escuelas Menores s/n. 37185 Villamayor de la Armuña (Salamanca)
Galicia	IES de Pastoriza	Rúa do Lagarto, esq. Furoca s/n 15140 Pastoriza (Santa María) Arteixo. A Coruña

Regarding the level established to complete this pilot, it was considered convenient to develop it for pupils in the third year of secondary school, since these pupils already have experience with the use of netbooks, having previously participated in the initiative and taken part in the 1:1 methodology.

The participating schools have entered into various commitments as a condition of admission to the project. The commitments are:

- Presentation of an educational project that contains:

1) Description of how the teacher uses the tablets: preparation of lessons, creation of educational materials, use in the classroom, use with other partners, etc.
2) Type of educational resources
3) Participation in the European portal
4) Description of how the teacher uses the tablets with the pupils
5) Description of how pupils make use of the tablets in and outside the classroom

- Presentation of an eTwinning project developed with the tablets
- Completion of questionnaires
- Participation in the European portal of the project
- Participation in the Ministry of Education portal

SUPPORT AND ORGANIZATIONAL ASPECTS AT NATIONAL LEVEL

INTEF (Spanish national institute for educational technologies and teacher training) organized support for these schools, in order to follow up, to ensure the proper implementation of the pilot and to achieve specific outcomes in the Spanish context regarding on the impact of the tablets in the classroom on the teaching process. These outcomes should be potentially transferable to other schools and help education authorities in deciding on most appropriate type of equipment for schools. This support consisted of:

- Coordinating the online working sessions planned throughout the life of the project
- Supervising and advising on the pedagogical projects presented by the schools for the completion of this pilot
- Providing communication environments to facilitate the exchange of ideas and the sharing and solving of problems as well as the exchange of methodologies and resources, especially amongst teachers in the same areas
- Coordinating visits to the schools to carry out interviews
- Recognizing the teachers' participation in this pilot through training grants
- Publishing and disseminating the experiences
- Publishing and disseminating the data collected from this pilot through the surveys

Apart from these support activities, the INTEF established the following organizational aspects to facilitate implementation of the project:

- To facilitate the completion of an eTwinning project, the teachers who conducted it in each school are eligible to apply for the training courses offered by the INTEF, whose second edition began on last 23 February
- The collaborative working space was enabled, usually planned for projects of this nature in a Moodle environment on the INTEF servers
- It is planned to certify participation to this pilot with 60 hours of training, for which participating teachers from each school provided:

  1) An initial pedagogical project for the use of tablets in and outside the classroom
  2) A monitoring report produced towards the middle of the pilot duration, which contains the necessary amendments and adjustments for the implementation of the plan initially scheduled
  3) A final report which presents a compilation of data from the project carried out: area, objectives, contents, methodology, resources used, work environments and tools, and which provides learning resources generated during the project and an assessment by the teacher.

COMPARATIVE STUDY ON TABLET OPERATING SYSTEMS

Throughout the month of February 2012, different operating systems – Android, Linux and Windows – were tested on the Acer Iconia w500 tablet. The main objective was to provide a brief comparative study to determine which one is most appropriate for an optimal performance of the various features on the tablet to cope with pedagogical scenarios of field research, shared devices, etc.

In short, efforts were made to find out about the benefits of tablets compared to notebooks, currently established in the classrooms, in the light of the substantial improvements in interactivity, usability and training opportunities, so as to assess the possible replacement of equipment.

Below follow the results obtained after the development of tests and the relevant assessments for each operating system analysed at the INTEF, Ministry of Education, Culture and Sports.

ANDROID 4.0.3

The interface is quick and functional. It responds well to multitouch handling in order to zoom, click or double click. Applications are fairly accessible in the main menu with a good screen resolution and an optimal size for the icons, buttons and links, so it can be handled by all types of users.

However, it lacks some basic applications that should work properly on the tablet, such as the camera, Bluetooth or video playback and video streaming from the Web. These problems could not be resolved even by installing different applications and codecs for that purpose.

A version of Flash player compatible with this operating system and this tablet could not be found either, something that also happened with the Java Virtual Machine, so that Web content based on these plugins (as is commonly the case with existing resources on the INTEF website) cannot be displayed.

As a result, even though interactivity with this equipment is good, it would be necessary to await upcoming updates to bring out the most in the tablet performance with Android.

ANDROID 3.2.2

This version features a slower interface and may be outdated as, even though you are using the touch screen, it is necessary to move the cursor that appears on the screen with your finger and place it on the point you want to click on.

Among the multitouch functionalities, the two-finger zoom option, allowing you to enlarge the text or images of windows to the size you want, is not available, whereas it is available with Android 4. It only allows the double click which applies a preset zoom to the text area where the tap is given.

Automatic screen rotation also does not work when you turn the device, even when the option is enabled in the settings panel.

Conversely, with this version we managed to display videos and video streaming (e.g. YouTube), but some plugins such as those that come with the mVideoPlayer package or similar had to be installed

A version compatible with Flash and Java could not be found either, which is a further disadvantage when accessing websites that need it to display their full content.

When the camera app is started with this version, it does not close immediately as with Android 4.0, but it does not allow it to operate either, asking for an SD card to be inserted.

Moreover, during the tests, the system proved to be unstable and some applications often closed of their own accord.

ANDROID 2.0

During the experiment with this version, the system was really unstable, with persistent failures and crashes of the device. The interface is slow and the touch screen is not available. It is necessary to scroll through the menus with the cursor handled from the keyboard, complicating the user-machine interactivity. The camera, once again, did not work, perhaps due to the absence of an SD card.

On this occasion, a version compatible with this device and this operating system could not be downloaded either, and when we tried to evaluate the video and sound, the system crashed completely.

This is why it would be really unwise to install it on this tablet model.

LINUX UBUNTU 5.0.1.4

This operating system features an interface with the usual Ubuntu look and feel. While this is quite efficient, the window buttons are rather small, making it difficult to click on them properly, at least with the screen resolution used by default.

The camera, sound and display of videos and video streaming work properly without having to install extra programmes; the multitouch functionalities are not available.

It does not include automatic screen rotation either, although this can be done manually in the screen setup menu by selecting Position Screen Vertical.

Displaying Web content with Flash and Java was done without any difficulty and it was not necessary to install additional plugins.

WINDOWS 7

This is the operating system pre-installed by the manufacturer and which should perform best.

The experience with this OS was indeed generally good. The camera operated properly, and videos and video streaming could be displayed without the need to install additional plugins to display Flash and Java.

Although the interface aspect is classic for Windows on a PC, some buttons and links on websites can be rather small and it can be difficult to try to click on them, even if the option allowing to enlarge the size by 25% through the control panel is enabled, something that any user should overcome with practice in handling the tablet regularly.

This operating system features a rather slower multitouch than on Android, but this is fairly comprehensive: it is possible to zoom with a double tap, with two fingers, to page up or page down, to go back in the browser and other options detailed graphically in the figures on the following pages.

The only thing that was not possible was to rotate the screen image automatically when turning the tablet vertical, something that we could do by ourselves, however, by entering the setting for monitor orientation and selecting Vertical as preferred orientation.

Gesture	How you do it	What it does
press	Press the item once.	Opens or launches whatever you have pressed.
double tap	Press twice on the item, in quick succession.	Zooms in or out in stages.
press and hold	Press and leave your finger there for a moment.	Opens a context-specific menu (like right-clicking with a mouse).

Fig. 1 Actions that can be performed on the touch screen with Windows 7 on tablets
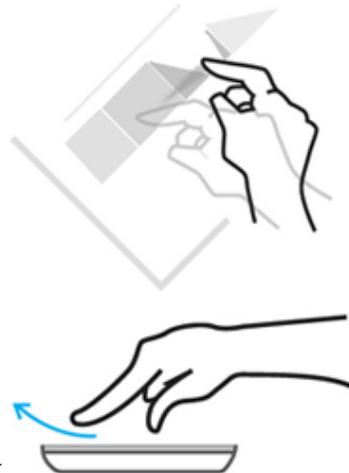
Gesture	How you do it	What it does
pan	Place your finger on the screen and maintain contact as you move it around.	Moves through screens or menus at a controlled rate.
flick	Move your finger quickly in the direction you want the screen to move.	Quickly scrolls through menus or pages or moves sideways in hubs.
pinch and stretch	Make a pinching motion with your thumb and forefinger on the screen or move them apart.	Gradually zooms in or out of a website, map or picture.

Fig. 1 (Continued). Actions that can be performed on the touch screen with Windows 7 on tablets.

WINDOWS 8 DEVELOPER PREVIEW

This is a test version for developers, available at present in English. This version incorporates the new Metro interface for accessing applications, with an innovative appearance based on the "Live Tiles" concept, with icons looking like tiles, where each application is represented by a box or rectangle that can display dynamic information.

With this interface you can access the open programs by sliding your finger from the left screen margin to the right. You can also access other menus by doing the same from below or from the right.

In this version the Windows button incorporated on the tablet gives us the option to move from the desktop to the apps and back again.

The cameras that the tablet incorporates were tested with Skype and they work properly, both front and rear, even though they did not recognize other programs such as Youcam.

You can also watch the videos and video streaming properly without needing to download plugins or extra extensions.

The multitouch options respond well, moving the images very quickly when it comes to enlarging text or images, for example for a website.

The size of windows, icons and buttons is not too small provided that the medium-sized screen resolution or 125% setting is enabled.

Java and Flash content could be displayed properly with the browser pre-installed with this version of Windows, Internet Explorer 10, although it is recommended that Chrome or Firefox also be installed.

The system does not offer the option to rotate the screen image automatically when you turn it vertical, but as with Windows 7, it is possible to modify manually the **monitor orientation setting** to make it vertical.

WINDOWS 8 CONSUMER PREVIEW

In this recently released version of Windows, substantial amendments on the Windows 8 Development Preview are barely noticeable.

Only slight changes are visible on the Metro Interface, with some changes in the Live Tiles installed by default on the Windows 8 Development Preview, though these are really customizable by the user.

This version includes by default a first panel of Tiles to see at a glances the applications most requested by the users, such as the Store to download new apps, Maps which takes you directly to the Google Maps website, Internet Explorer to surf, Photos, Video, Mail, Music, etc., all with the new look that Microsoft is developing to equip this operating system with a new appearance and greater interactivity focused on tablets and SmartPhones, so that by means of the touch screen the user moves intuitively between the applications that are open.

Internet Explorer 10 responds quickly and accurately to multitouch, both with double tap and with two fingers to zoom, although there were some problems when it came to displaying content in Flash, even with the necessary plugins installed, something which did not occur with other browsers like Chrome or Firefox.

By contrast, Google Chrome runs very slowly when you zoom by means of the touch screen, and the lateral scrollbar to see the bottom content on webpages does not work properly.

Both sound and videos work well, also with video streaming. Java content is displayed correctly too.

Both cameras of the tablet worked properly with Skype and with the app installed in the Windows 8 main menu.

In brief, Windows 8 Consumer Preview is another preliminary version of what Windows 8 will be in the near future, and although it may have some more polished menus, it is not yet finalized.

CONCLUSIONS

The following table gives an overview of the available features with the different operating systems that have been tested.

	Android 4.0.3	Android 3.2.2	Android 2.0	Ubuntu 2.0	Windows 7	Windows 8
Camera	NO	NO*	NO*	YES	YES	YES
Video	NO	YES	NO	YES	YES	YES
Video Streaming	NO	YES	NO	YES	YES	YES
Sound	YES	YES	NO	YES	YES	YES
Multitouch	YES	NO**	NO	NO	YES	YES
Auto-rotate display	NO	NO	NO	NO ***	NO ***	NO ***
Flash player	NO	NO	NO	YES	YES	YES
Java	NO	NO	NO	YES	YES	YES

Table 1 Summary - features available with each operating system

*   The camera application incorporated with the operating system does not work without inserting an SD card.

**   Only allows the use of click and double-click on the screen.

*** *Does not operate automatically but can be done manually.*

Based on the tests performed, it can be concluded that, although Android may prove to be an interesting operating system for its quick interface and the possibilities offered by Android Market, maximum performance cannot be gained with any of its currently available versions on the Acer Iconia w500 tablet, version 2.0 being particularly problematic.

It is recommended to monitor the applications, extensions, plugins, etc., that are being developed in Android 4.0 to resolve the difficulties that exist at present, with this Acer tablet in particular.

By contrast, the experience with Ubuntu and Windows was more satisfactory, especially with Windows which provides multitouch options, not available with Ubuntu.

In Windows, particular attention should be paid to the evolution of the new version Windows 8 as it is still being developed. With its "Metro" interface it offers an innovative experience in terms of interactivity, making it more attractive and dynamic than previous versions of Windows.

All in all, if it is decided to establish this tablet in the classrooms, it should be installed with Windows for the time being and move to Android later, only if subsequent versions of this operating system correct the current problems of compatibility. Thus, for now, a greater level of interactivity and use of the touch screen, as well as access to the largest number of educational resources can be achieved with Windows.

ADDITIONAL MATERIAL

You can see some installation processes of different operating systems in:

http://www.ismailaligago.es/wordpress/?p=283

You can also see the features of Windows 8 Consumer Preview in video:

http://ntic.educacion.es/apls/moodle/web/mod/resource/view.php?inpopup=true&id=9385

(permission may be required to access this page)