

A Digital Learning Environment for Scottish Schools

1. This document proposes a **general model of a digital learning environment for Scottish Education from ages 3 to 18**. While we do not exclude the possibility of extending this to post-school education and, indeed, lifelong learning, we have not explicitly considered the issues around using this system to support the transition from school to further and higher education.

2. The model that we propose will provide a set of features to support the use of ICT in education, directly supporting the Curriculum for Excellence, which will be both more wide-ranging and easier to use than the support provided in the current Glow system. It will be a **flexible system**, where teachers and students will be able to access and use a range of applications and services of different types, **appropriate for different ages** and where it will be **simple to incorporate new web-based applications** as these become available.

3. Two **fundamental notions** have driven our deliberations on this environment which, for brevity will be referred to here as Glow+, although this need not necessarily be the final name chosen.

These are:

1. Teachers should be trusted to use their professional judgment in how ICT should be used.
2. As far as is possible, the system should be future-proof.

4. The first of these notions leads to a **system that does not force on users a fixed set of services and content** that have been decided by some external 'authority', however well meaning they may be. Rather, individual teachers should be able to decide which digital tools and services will be of most benefit to their students' learning. Having said this, of course, **a basic set of services will be made easily available through Glow+** so that teachers without detailed ICT knowledge can access 'best of breed' services.

5. This notion also implies that access to specific applications and services should not be limited by local authority policies on web filtering and that use of tools and services is not limited by poor school connectivity and/or lack of computers for student access.

6. The second notion leads to a **requirement for 'replaceable' services**. The pace of change of digital technologies is such that what is today's 'best of breed' service will be supplanted by a better service tomorrow. It must therefore be simple and straightforward to replace one part of the system with another that is functionally equivalent, superior or cheaper, as these become available.

7. This notion also leads to the requirement that the system must be both **device agnostic and accessible from anywhere at anytime**. Increasingly, access to the Internet is not through fixed computers but through mobile, 'always on' devices. This trend will almost certainly accelerate, and within the school life of many of today's students it is likely that use of desktop and laptop computers will become the exception rather than the rule.

8. The ICT for Excellence group **considered a range of possibilities for Glow+** from an extended, closed environment with a pre-defined set of services (like Glow) to a completely open environment where it is left entirely to the discretion of individual teachers as to what and how services are used. Our conclusion is that Glow+ should lie somewhere between these extremes. It should provide common services, such as data storage and authentication, along with a set of supported services that provide useful functionality, such as e-portfolios, services to support communications and collaborative working, and multimedia services.

9. By way of illustration, examples of these services might include blogs such as Wordpress, social networking systems such as Edmodo, video storage such as YouTube and email such as Outlook. As well as these supported services, it will be possible for teachers and local authorities to bring in other tools and services that they need to support specific learning needs. Examples of unsupported services might include an art teacher encouraging students to post daily photos of their lives through a service such as blipfoto, or subject teachers share Powerpoint presentations through a service such as Slideshare.

10. To make clearer what this might mean in terms of user experience, consider the following scenarios:

Scenario 1

Jill is an S2 pupil at a secondary school in Dundee. She has a smart phone of her own and the family has a shared Samsung tablet and a Dell laptop computer. At school, Jill signs on to the school computer and is presented with a personalised Glow+ environment, which includes a range of services, some chosen by her teachers and some she has chosen herself from the Glow app library. She is working on a Celtic art project and she uses Google to research a range of art sites. She sketches out some designs on paper then uses the camera on her phone to photograph what she has done and uploads this using the school wifi to her personal Glow+ space. Her homework is to complete the design and write a short commentary on her ideas.

At home, she uses the family tablet to sign on to Glow+ and she then uses an artwork 'app' to process her photograph and to extend the work, add colour, etc. She finishes this and to complete the work she moves to her home laptop to type up her commentary. She uploads the finished work to Glow+ and sends a message to her art teacher that it is available for review. Her teacher looks at this in a free period before Jill's next art class using a school tablet and, in class, discusses the work with Jill. After the discussion, the teacher and Jill decide that the work should be shared and they publish it to the school web pages that show examples of students' work. In addition, the work is included in Jill's e-portfolio - her record of schoolwork from age 3 to 18.

Scenario 2

Jack is a primary school teacher in Ullapool, teaching P6 pupils. He has decided that a class project should be focused around the fishing industry in the area, looking at the history, development and economic impact of fishing. As part of this, pupils are asked to gather and share reminiscences from relatives, use newspaper archives and collect old photographs related to fishing and fishing communities in the area. Pupils use a Glow+ wiki to gather together fishing stories, and SCRAN to access newspaper archives and photographs. However, Jack also needs a photo sharing site as he wants pupils to take and comment on each others' photos and to upload scans of old photographs that they may have in their families.

Jack sends an email to a primary school teachers group, of which he is a member, to see if anyone can recommend an appropriate system. Two teachers reply and both suggest that he uses KidsTakePics, a photo sharing site that allows teachers to check and moderate content. As KidsTakePics is not integrated with the Glow+ authentication service, he sets up a teacher and a class account. He uses the Glow+ setup service to add KidsTakePics to the services seen by the pupils in his class so that when they login, they can immediately use the system to upload photos from their phones and class computers.

11. These scenarios encapsulate a number of features that we propose for the Glow+ system:

1. An **authentication system** that is used to identify Jill and Jack- their identities are used to ensure that they are presented with their own content and services that are appropriate to the work that they are doing.
2. A **storage system** that allows anywhere, anytime access from any Internet-enabled device.
3. **Access to 'standard' services** such as search engine, word processing, wiki, email groups and SCRAN as well as specialised applications such as an artwork system. These are all internet-accessible either through a browser or through a specialised app.
4. The inclusion of services that allow students' work to be published and retained in an **e-portfolio**.
5. The **ability of teachers and other users to add new features** – Jack brings in KidsTakePics because it meets a specific need for his class.

12. The **model of Glow+ that we propose is flexible** and we envisage that the set of services available will **evolve with experience of the system and with available budget**. In our discussions to date, we have identified the following services as important:

1. **Core services**, which may be used by other services in the system. These include authentication management, which allows users to log on and be identified to the system; storage, which allows user data to be stored in a safe and secure way; and analytics, which captures information about the use of the system and makes it available to users and managers.
2. **Application services** - email, chat, calendaring, instant messaging, word processor, search, spreadsheet, presentations, wordpress blogs, collaborative writing, synchronous video conferencing, image editing and aggregation, on-line bookmarking, video storage and presentation, e-portfolio. We recognise that initially some of these may be supported but not integrated services - depends on both budget and technical issues. It is also likely that widely-used subject specific services may need to be provided in this group, e.g. computer programming environments, language acquisition.
3. **Content services** - services that provide access to procured content such as online dictionaries, e-books, commercial, subject specific learning materials. The group needs to look further into what specific content should be recommended for support and how best to present them.

13. In addition, a flexible and agile governance process will need to be established to explore and approve the specific services that should be supported, and the timescale and consultation needed to implement changes.

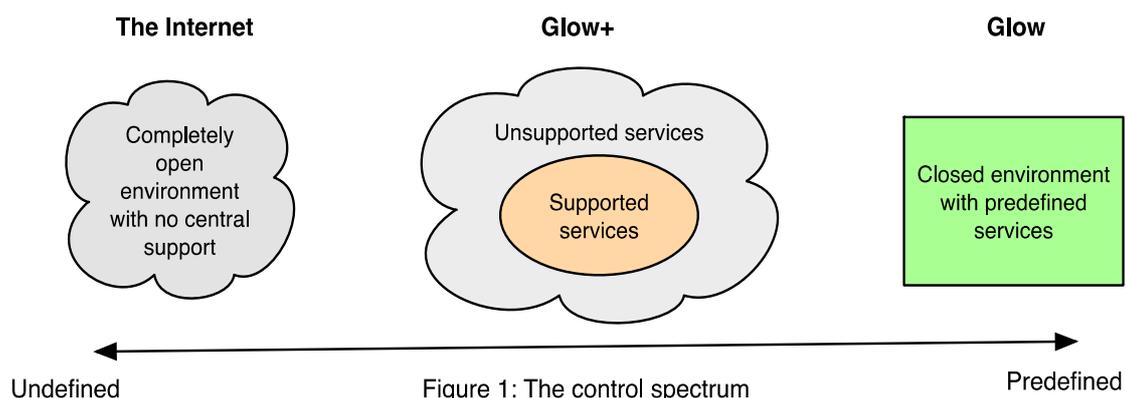
14. **Glow+ as a system cannot be divorced from the environment in which it is used**. Currently, teachers are frequently frustrated because educationally useful content and material is blocked by apparently arbitrary web filtering policies applied by local authorities. Furthermore, the sharing of teacher-produced educational materials is hindered by copyright policies adopted by local authorities.

15. There are 4 requirements for its operating environment that we think are essential if Glow+ is to achieve its potential.

1. Schools must have **adequate broadband capacity** so that the service offered to students and teachers is at least comparable with what they can get at home.
2. Schools must have **sufficient numbers of computers/devices** that students can have access to a computer when this is required as well as policies that allow students to use their own laptops, tablets and smartphones on school networks.
3. There must be a **Scotland-wide policy for web filtering**, which is applied consistently by all local authorities. This should be a liberal policy in the sense that the norm should be that all web sites and services are accessible unless the policy states that some sites (such as pornography) should be explicitly blocked. Teachers must have a role in the setting and review of the filtering policy.
4. There must be a **Scotland-wide policy on sharing of teaching materials**, which allows those materials to be freely shared amongst teachers and others, without the need for LA approval.

A model of Glow+

16. As we have discussed, there are a range of options for Glow+ from a tightly controlled, highly integrated system at one end to a completely uncontrolled, un-integrated system based on whatever services individual teachers think appropriate. Figure 1, shows Glow+ bridges these extremes by providing both a set of 'best of breed' supported services as well as a mechanism to include any other services which teachers believe are useful to support learning in their classes. These operate as stand-alone, unsupported services.



17. Figure 2 adds detail to this picture by identifying levels of service and which provides a basis for services to be introduced into Glow+ and, if these prove useful, to move from unsupported to supported services.

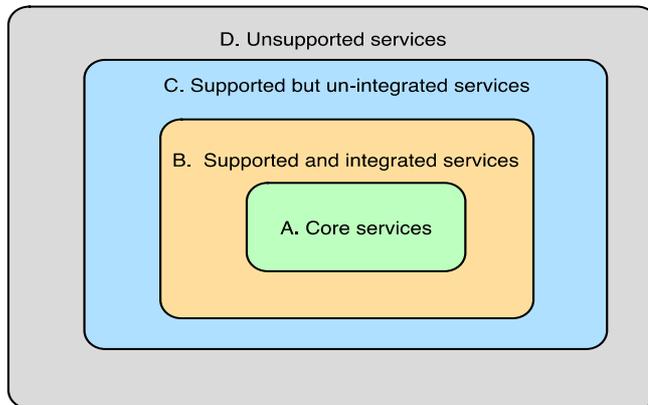


Figure 2: Service types

A. **Core services**, which must be procured and supported, and which may be used by any other system service. At this stage, the key services we have identified are an *authentication management* service and a *storage* service. *Learner analytics* may also be needed as a core service.

- B. **Integrated and supported services**, which are services that are accessed through the Glow+ identity management system and whose data may be stored in the Glow+ storage service. An e-portfolio service is an example of an integrated and supported service.
- C. **Supported but un-integrated services**. These are services that are not necessarily integrated with the core services (perhaps for cost or technical reasons) but which are recognised as useful and hence supported by the Glow+ management authority. An internet phone service such as Skype is an example of a supported but un-integrated service.
- D. **Unsupported and un-integrated services**, that have been identified as useful by teachers, who take responsibility as to how they are used. A sharing service such as Slideshare is an example of a possible unsupported and un-integrated service.