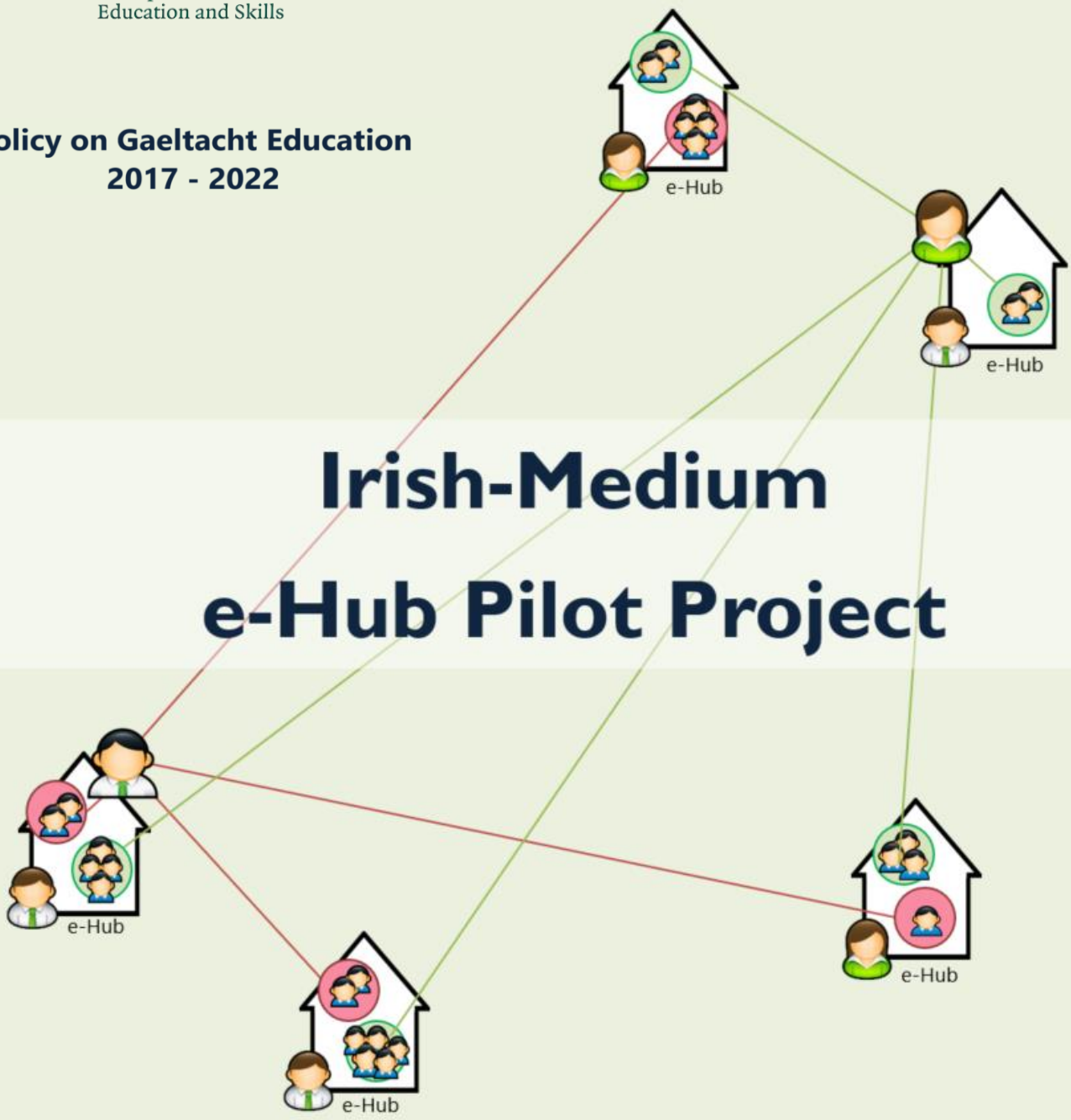
An Roinn Oideachais agus Scileanna
Department of Education and Skills

Policy on Gaeltacht Education
2017 - 2022



Irish-Medium e-Hub Pilot Project

International Review and Advisory Report

May 2018

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International Review and Advisory Report

Commissioned Report: H2 Learning

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Foreword

A key aim of the Department of Education and Skills' *Policy on Gaeltacht Education 2017–2022* is to strengthen Irish-medium educational provision in post-primary schools in the Gaeltacht. The provision of a wide range of subject choices through the medium of Irish poses a challenge for post-primary schools due to a lack of availability of suitably qualified teachers with high levels of proficiency in Irish and the generally small size of schools in rural Gaeltacht language-planning areas. In seeking to address this challenge, the *Policy* identified the potential for the establishment of a pilot Irish-medium e-learning hub to extend the range of subject choices through Irish available to students in small post-primary Gaeltacht schools and Units (*Aonaid*).

Other countries have experienced similar challenges in offering an expanded range of subjects to students and the Department recognises the importance of learning from these experiences to inform the creation of an e-Hub Pilot Project for post-primary schools in the Gaeltacht. This International Review Report examines the provision of supplementary online distance education in a number of countries. The report highlights examples of good practice that provides guidance on how best to extend the range of subject choices at post-primary school level.

A key principle within the Digital Strategy for Schools 2015-2020 is that digital technology, when embedded within teaching, learning and assessment activities, can enhance the learning experiences of all students. Digital technology can play an important role in supporting inclusion and diversity for all students attending schools in Gaeltacht areas by enhancing their learning opportunities through the medium of Irish. Furthermore, the e-Hub Pilot Project supports the STEM Education Policy Statement by providing students with an opportunity to study high-level Leaving Certificate Physics. This is an innovative and very exciting pilot as it allows teachers and learners to connect and interact at a distance using digital technology.

This review and advisory report was carried out and compiled by Dr Michael Hallissy and John Hurley of H2 Learning in close collaboration with the Gaeltacht Education Unit in the Department of Education and Skills. A special word of thanks is extended to the many international experts and practitioners who gave of their time to share their experiences of post-primary online learning programmes. Their experiences and valuable insights have greatly informed the content of this report and each phase of the 3-year e-Hub pilot initiative.

The Gaeltacht Education Unit looks forward to supporting teachers, students, their schools and their parents during this new virtual learning experience. It is hoped that the pilot will inform future virtual-learning opportunities to enrich the teaching and learning experiences for students into the future.

Gaeltacht Education Unit

Department of Education and Skills

May 2018

Contents

Section 1: Introduction

This report presents the findings of an international review undertaken to inform the creation of an e-Hub Pilot Project or e-school with virtual classrooms to support Irish-medium post-primary schools participating in the Gaeltacht School Recognition Scheme. The e-Hub pilot project will connect a number of small Irish-medium schools or Irish-medium units in Gaeltacht areas so as to extend the range of curricular choices available to students, particularly at senior cycle, in these schools *(Policy on Gaeltacht Education 2017-2022*; p.21).

The report is divided into 5 sections as follows:

Section 1: Introduction

Section 2: Virtual Learning Case-studies

Section 3: Essentials of Good Online Learning

Section 4: Recommendations for Gaeltacht e-Hub

Section 5: Key Roles and Procedures.

Setting the Context

There has been a dramatic increase in online learning globally for students enrolled in primary and post-primary education, and this has been facilitated by the growth of the internet (Barbour, 2017). It is estimated that over 4.6 million students are currently engaged in online learning around the globe (Gemin, Pape, Vashaw and Watson, 2015). There is a long history of school-aged students learning at a distance, particularly in rural areas, where it often proved challenging for young people to attend school or to access a full curriculum. In the past, these students typically enrolled in correspondence courses that were supported by a range of resources that included snail mail, television, radio, internet and more recently mobile phones. The steady pace of improvement and affordability of mobile devices and of broadband access has contributed to opening-up new modes of learning to students in schools. This can range from a student enrolled in one class or a subject online to participating in all their learning activities online. Thus, there is an emerging continuum of learning models that moves from traditional face-to-face (F2F) learning to learning entirely online, as depicted in **Figure 1** below (Graham et al., 2013). Therefore, a student can participate in a class where there is no element of online learning (F2F) to a situation where their entire learning experience is online (with no F2F components).

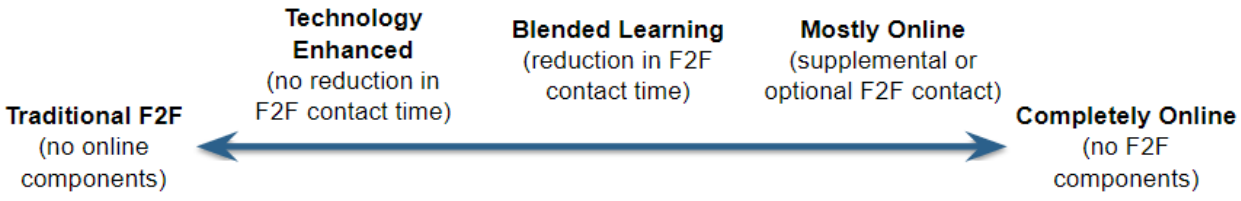


Figure 1: Continuum of Learning Models (Graham, et al. 2013 in Graham, 2017)

The terminology and classifications associated with online learning have developed over time, and they are becoming more standardised (Barbour, 2017). When a student participates in a full-time online learning programme, they do not attend a brick-and-mortar school, and such programmes are most often referred to as *cyber schools* (Barbour, 2013). Whereas when a student only takes one or more classes online in a supplemental manner, they are enrolled in a *virtual school*. Other relevant terminology associated with virtual schools and online and blended learning include synchronous and asynchronous learning, as outlined in **Figure 2**.

Online learning is defined as:
Teacher-led instruction delivered primarily via the internet that includes software to provide a structured learning environment, and where the teacher and student are separated geographically. It may be synchronous (communication in which participants interact in real time such as video conferencing) or asynchronous (communication that is separated by time such as e-mail or online discussion forums).

(Michigan Virtual University, 2017; p.3)

Blended learning is defined as:
Any time a student learns at least in part at a supervised brick-and-mortar location away from home and at least in part through online delivery with some element of student control over time, place, path and/or pace; often used synchronously with hybrid learning.

(International Association for K-12 Online Learning, 2011; p.3 in Barbour, 2013; p.39)

Figure 2: Online Learning and Blended Learning

If a student is engaged in both face-to-face and online learning, as part of their formal education experience, they are engaged in some form of blended learning. Therefore, the Department's proposal to establish a hub or e-school with virtual classrooms in existing schools connected to a number of small Irish-medium schools or Irish-medium units in Gaeltacht areas[1] would be classed as a blended online learning programme. Furthermore, when students participate in a blended online learning programme because they are unable to access certain subjects in their school, they are participating in a supplemental educational programme. There are a range of blended learning models (Horn and Staker, 2015) and all have the characteristic of reducing the amount of face-to-face contact time. The blend between synchronous and asynchronous learning varies, depending on the learning context.

This report describes a number of existing online learning models that are designed to provide supplemental education to students based in brick-and-mortar schools. Typically, these students are attending smaller rural schools, where there are insufficient student numbers or where there is no teacher available to teach a face-to-face class in a particular subject. In such cases, students are enrolled in a virtual school where they experience a supplemental blended-learning model to access a specific course or courses.

[1] Policy on Gaeltacht Education 2017-2022, www.education.ie

Section 2: Virtual Learning Case-Studies

The review of existing online learning practices focused on programmes designed to expand curriculum choice for students based in rural areas, particularly for senior students in their final two years of school. An international literature review was undertaken, and discussions took place with key individuals in New Zealand, Newfoundland and Labrador, Western Australia and Scotland, as well as schools in Ireland who are, or have been, engaged in virtual-learning programmes. While the online learning literature related to schools is growing, there is a recognition that much more research is required to investigate the impact of such programmes on teaching, learning and assessment practices. The cases identified in this section are included because they are most relevant to the Irish situation.

New Zealand - NetNZ

Many schools in New Zealand face difficulties in increasing the range of subjects available to their senior students (Pratt and Pullar, 2013), particularly those located in rural areas where schools tend to be smaller. Many of these smaller schools are unable to have specialised teachers in all subject areas, and this restricts the range of subjects that can be offered to students. This is not a new challenge for New Zealand due to its sparse population and its large number of small rural secondary schools. They have actively addressed this issue in the past through a range of interventions that evolved from correspondence courses, which were introduced as far back as 1922, to video-conferencing in the 1990s, and to online courses from 2009 onwards (Barbour and Wenmoth, 2013). Thus, New Zealand has a long history of proactively addressing such challenges in order to find solutions for their students.

In 1994 seven schools in the Canterbury region came together to provide a wider range of curricular opportunities to senior secondary school students by creating the Canterbury Area School's Association Technology project (CASAtech). This consortium used an audio graphics system[2] to connect schools, with each school allocating a teacher to teach one course and students from any of the seven schools could enrol in that course (Wenmoth, 1996 in Barbour and Wenmoth, 2013). Other schools in New Zealand subsequently formed similar consortia to ensure rural learners had the same access to learning opportunities, as those in the more urban regions of the country. In this way, schools came together to share resources and to find innovative solutions to meet the needs of their students and thereby addressing any perceived inequalities of provision.

NetNZ Model

The consortium model and approach to online learning have evolved and developed in New Zealand over the intervening years and today one of the leading consortia is NetNZ[3], which is based on the South Island. The NetNZ mission is to "develop an environment for sustained innovation and development of quality, online learning experiences, for anyone, anywhere across New Zealand and beyond" *(Sudlow, 2017)*.

[2] Audiographics system, a form of teleconferencing that combines audio conferencing with a personal computer-based visual conferencing system. It was particularly popular in distance learning in the 1990s.

[3] NetNZ, http://www.netnz.org

NetNZ courses are generally provided by member schools themselves. Schools that choose to provide courses earn enrolment places based on the number of courses they put forward, while schools that choose to receive courses only, pay for each enrolment on an individual basis. Each course is open to enrolments from other member schools, non-member schools, and individuals (home schoolers and international students (NZ students living in another country). Courses usually consist of 10-18 students from 5-10 different schools. Each school has an *e-Dean* who has the responsibility of providing on-site support for students and acts as a point of contact for the *e-Teacher* as s/he interacts with the students. Each course uses an online hub or class space which acts as the focal point for learning and interaction. These class spaces are developed by the *e-Teacher* using a digital tool of their choice. Some courses are fully online, but the majority include a mix of paper and online learning. Each class meets once a week using a live Web conferencing application (e.g. typically schools use Google Hangouts), and this acts as an important point of contact between the teacher and his/her students (Sudlow, 2017).

The NetNZ model comprises a learning community where schools are designing and offering courses to their community. The distances between these schools means that typically a teacher could not travel between schools, hence a decision was made to use Web conferencing along with text- and web-based resources to deliver lessons (Pratt and Pullar, 2013). Thus, a blended learning model was developed that involves a mix of synchronous (live learning sessions) and asynchronous learning (learning does not occur in the same place or at the same time).

Figure 3: NetNZ Model (www.netNZ.org)

New Zealand senior students typically have access to 4 to 5 hours of instruction time per week in a face-to-face setting in any one subject. NetNZ students would normally have 1 hour of synchronous contact with their teacher and fellow classmates, and 3 to 4 hours of asynchronous learning per week in their own time. The original decision to restrict synchronous interaction to one hour per week was made in the early days of online learning, when the cost of live learning sessions was more prohibitive. While this is no longer the case, NetNZ considers the blended model to be more effective than having learners only interact with their teacher via a live conferencing connection. They use free tools, such as Google Hangout, for the live sessions and Google Docs for the asynchronous sessions along with a range of resources that includes books, handouts etc. Within the learning community, there is a strong emphasis

on learners co-constructing knowledge and understanding together, and they encourage teachers not to be overly dominant in the setting. The ratio of 1 hour synchronous to 3 asynchronous tends to favour students who have strong lifelong learning skills and who are mature and sufficiently motivated to play an active role in their learning. NetNZ believes, however, that the approach implemented is appropriate for all learners, not just the more academically able students.

The e-Teacher and the *e-Dean* Role with NetNZ

The New Zealand approach goes beyond the mere provision of learning content and a tool to facilitate live interaction between teachers and students through the provision of a structure and an environment in which learning can flourish. The teacher who interacts with the students via conferencing software is known as an *e-Teacher*. *e-Teacher*s are employed by their home school and their web-conference class is incorporated into their teaching load. It has been noted that *e-Teachers* have varying levels of ICT skills and experience and are supported locally by school coordinators. Teachers typically come forward with suggestions on courses they would like to teach and likewise NetNZ management will seek out teachers to teach certain subjects. If a teacher cannot be sourced within the 60 schools that are members of the consortium, NetNZ will go outside and hire a specialist teacher. This, however, is not their preferred course of action.

Each school has a school coordinator whose role is to work with the teachers and students to ensure that everything runs smoothly. This role has evolved in recent years to become that of an *e-Dean*, a person who, in addition to their administrative role, also supports students with their course content and provides pastoral support. *e-Dean*s are now viewed as an essential component of the online learning experience and they are primarily there to provide support to the students. Typically, at the start of an academic year in February, the *e-Dean* will meet with the students and find out what they are interested in studying. They will monitor how the student's learning is progressing and they may provide assistance in using the technology if a student is experiencing difficulty. They regularly communicate with the *e-Teacher* and they form a triangle of communication between the teacher, the learner and themselves. NetNZ consider the role of *e-Dean* as a key support in helping students to develop their skills and manage their own learning. This is an interesting observation as it highlights the importance of education professionals in ensuring a quality learning experience for students.

Teaching and Learning with NetNZ

NetNZ promotes a knowledge-building approach where *e-Teachers* work with their learners to develop trust and an active approach to building knowledge and understanding. Teachers are timetabled for their 60-minute Web conference session each week. The web conference starts on the hour, irrespective of start times of classes in their home schools. Students are expected to be timetabled for their NetNZ classes, and to be released from other classes to attend their live conference session. The issue of timetabling has been a real challenge for schools and initially they attempted to match up timetables in different schools, but this proved to be difficult. In addition to the students, teachers need a break after having participated in a live conferencing session as such sessions can be quite demanding and intense. NetNZ believes that if a student misses a face-to-face class to participate in their conference session they can catch up on their learning in subsequent face-to-face classes. There is an onus therefore on the school to recognise that students will need to be released from face-to-face classes

and that they will need to catch up on any material discussed during face-to-face classes at a later time. This approach has worked well to date, as the alternative of trying to align timetables was problematic.

Teachers use a range of resources that includes traditional printed resources, such as textbooks and workbooks, videos and websites. They utilise multiple technologies to engage with learners and these include Google Docs, e-mail text messaging and apps such as Padlet[4] to actively involve students in their learning. Darren Sudlow, Executive Leader of NetNZ highlighted that "online learning can often be framed as a sterile, content-driven environment that isolates teenagers from the world, but this does not have to be the reality"[5]. In the NetNZ model, teachers are encouraged to design engaging learning activities where students are actively engaged in their learning. Furthermore, teachers are not mandated to use any specific software or learning management tools, though the majority use Google Apps by personal choice.

The *e-Teacher* and their students are encouraged to attend two face-to-face day-long meetings in addition to the live Web conferencing sessions. The first meeting takes place at the start of the school year in February and the other is in August. These sessions are opportunities to build relationships between teachers and students, and, in addition, they provide opportunities to conduct practical assessments.

There are three main approaches that teachers use with their students and most use a combination of these during any school year.

- *Web conference only*: The 60-minute Web conference is the only synchronous contact some teachers have with their students.
- *Web conference plus face-to-face*: In some cases, teachers take advantage of being within driving distance (e.g. 30 minutes) of their students, and augment or replace their scheduled video-conferencing sessions with face-to-face visits.
- *Web conference plus additional sessions*: Teachers augment their scheduled video-conferencing sessions with additional sessions. These are usually delivered to a subset of students, such as individual student or students from only one school. These are often run on a question and answer basis or are used to review work with students who are experiencing difficulty.

The NetNZ model appears to be working well and has consistently evolved over recent years to support learners and provide them with quality supplemental education.

Newfoundland and Labrador - CDLI

The experiences of the Canadian province of Newfoundland and Labrador appears quite like the experiences of New Zealand, as they also have been engaged in distance learning for schools since the 1930s (Saqlain, 2016). They are one of several provinces in Canada that are engaged in online learning. Many of their secondary schools are small and, where they exist, there is often an issue with the recruitment and retention of qualified teachers, which provides challenges in offering a comprehensive curriculum. One of the major challenges facing schools in Newfoundland and Labrador relates to their rural context. The total geographical area of the province is twice that of Great Britain with more than

[4] Padlet is an online virtual "bulletin" board, where students and teachers can collaborate, reflect, share links and pictures, in a secure location.

[5] NetNZ Connected, https://hail.to/netnz/article/yCbfEtT/accessibility

half of the population living in the capital and its suburbs. Thus, rural communities are spread out and there is a need to provide schooling solutions that attempt to overcome this issue.

The Centre for Distance Learning and Innovation (CDLI)

Newfoundland and Labrador established the Centre for Distance Learning and Innovation (CDLI) in 2000 to increase the learning opportunities and career options for students across the province, but especially those in rural areas. After a successful pilot programme, the CDLI rolled out internet-based courses to schools during the 2002-03 school year. The system used a combination of the WebCT learning management system (LMS) to support asynchronous learning and a synchronous tool, vClass, to support live interaction with students. Today the CDLI uses the Desire2Learn LMS (now rebranded Brightspace)[6] and Blackboard Collaborate[7] for the live learning sessions, and these tools provide learners with a blended learning experience that comprises a mix of asynchronous and synchronous learning activities. CDLI has forty-four (44) staff which includes two program specialists, two training specialists, a connectivity and communications specialist, an IT systems manager, twenty-nine e-Teachers, a guidance counsellor, and eight administration and support staff.[8] Prior to the 2017-18 school year, the CDLI was an independent unit within the province of Newfoundland and Labrador. The province has experienced funding constraints in the past number of years and as a result the CDLI was merged into one of the two school districts within the province. This district is currently providing support to the two school districts.

The Centre for Distance Learning and Innovation's role is to:

- Increase learning opportunities and career options for students; particularly those in small and isolated schools
- Develop and deliver e-Learning programs and services for students and teachers
- Develop and deliver courses for senior high-school students
- Develop and deliver professional learning programs for primary, elementary and secondary teachers
- Provide programs and services for other adult learners using the internet
- Develop and export educational products and services.

This model is similar to the NetNZ model in that it involves:

- A mix of synchronous and asynchronous learning experiences
- *E-Teachers* being responsible for designing and teaching the online lessons
- *M-teachers* providing support to learners in their schools, similar to *e-Deans* in NZ

The CDLI model designs course content centrally and a course template has been developed to facilitate student learning. The curriculum is developed at the provincial level and the CDLI then designs and delivers a course to meet this specification. The CDLI strives to design learning experiences that are on a par with those in face-to-face classrooms and thus a similar time allocation is dedicated to virtual lessons as to face-to-face lessons. They strive to provide a consistent curriculum for all students in the province and they develop the school timetable and monitor how teachers and students interact.

[6] Desire2Learn, www.d2l.com/en-eu
[7] Blackboard Collaborate, http://www.blackboard.com/online-collaborative-learning/blackboard-collaborate.html
[8] About the Centre for Distance Learning and Innovation (CDLI), https://www.cdli.ca/about-us.html

Instructional Model (CDLI)

Where a face-to-face course has 110 hours of learning time, care is taken by the CDLI to ensure that the virtual learners have access to the same amount of learning time. Initially CDLI scheduled a mix of synchronous and asynchronous time slots for virtual students on the school timetable. However, CDLI found that schools were not always affording students the time to use the asynchronous timetabled periods for independent learning. For example, the CDLI works on a 3-week schedule and previously had timetabled Mathematics for 5 synchronous and 5 asynchronous sessions. However, they found that students were being encouraged to attend face-to-face sessions in other subject areas, when they were timetabled for an asynchronous session. The CDLI informed schools that such practice was not allowed and now all sessions are timetabled as synchronous. Typically, a teacher will speak to the students briefly at the outset of some sessions and then set them work that they complete individually and/or in groups. Thus, there are no longer any asynchronous sessions on the timetable, even though students do engage in self-directed and group work online during scheduled class periods.

The CDLI's e-Learning courses are targeted at students who are currently enrolled in high schools in which the provision of certain aspects of the curriculum is, for whatever reason, deemed to be problematic. The instructional model is therefore oriented to the needs of typical adolescent learners. The e-Learning model takes an active approach to learning where interactions are encouraged, for example, between the student and content, between the student and the instructor and between groups of students.

These online courses adhere to the following learning principles:

- Learning is a process of actively constructing knowledge
- Students construct knowledge and make it meaningful in terms of their prior knowledge and experiences
- Learning is enhanced when it takes place in a social and collaborative environment
- Students need to continue to view learning as an integrated whole.

CDLI uses the following e-Learning model as its approach to program delivery.

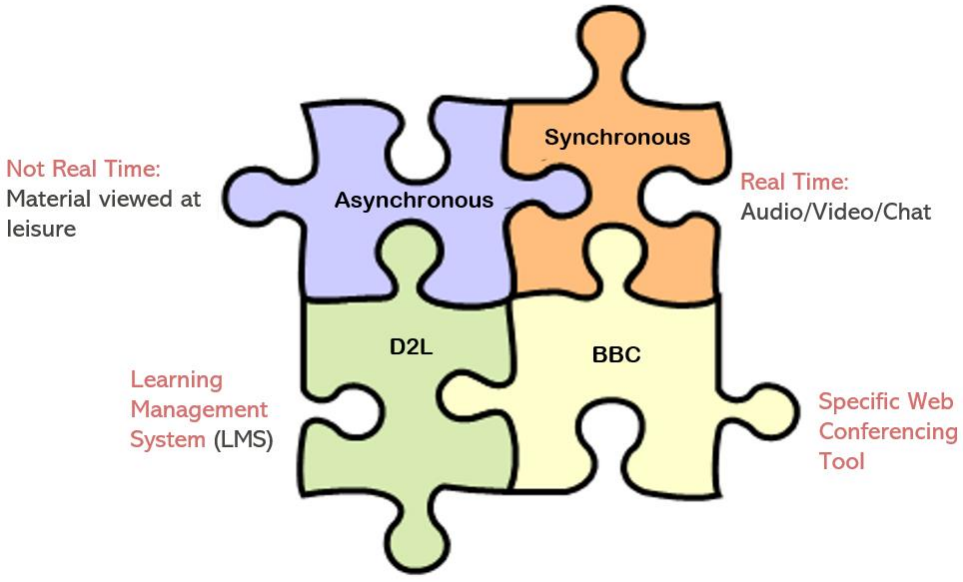


Figure 4: CDLI e-Learning model (CDLI, 2018)

CDLI e-Learning Model

The CDLI e-learning model consists of both synchronous and asynchronous learning. A learning management system, Desire2Learn (D2L), is used for the asynchronous elements of the programme and Blackboard Collaborate (BBC) is used for the live sessions. D2L consists of a collection of course delivery and management tools housed in a secure, password-protected environment for delivery over the World Wide Web. D2L is housed on a dedicated Server and is used by many post-secondary institutions within the province.

The web-based resources contained within D2L fully describe what a student must do to achieve the course outcomes. These include:

- *Course Calendar* which is continuously updated by the *e-Teacher* and contains important day-to-day information such as schedules, deadlines and notification of upcoming events such as tests and synchronous classes
- *E-mail* which provides an easy-to use asynchronous method for communications that are not time-critical
- *Dropbox* which is used for the submission of written material including selected evaluation instruments
- *Threaded Discussion Forums* which offer opportunities for students to engage in co-operative learning activities to extend the depth of their understanding of any given concept
- *Instructional content* which can be viewed whenever the student requires it and its usage can be tracked by the instructor.

The synchronous interactions are facilitated through BBC and this component of the program allows teachers and students to interact in real time over the internet. It is the primary mode of real-time interaction between students and teachers and it provides several collaborative tools, such as a Class List Display, Message Window and White Board to facilitate interaction.

CDLI Web Portal

The CDLI Web portal is the focal point for all virtual learning and it provides easy access to user groups such as principals, *e-Teachers*, or *m-Teams*, to the various tools and resources. The portal provides access to a range of online resources which are available to all Newfoundland and Labrador (NL) students and these include:

- online content for over 40 provincial courses
- 1700+ Multimedia Learning Objects (MLOs). These MLOs are interactive course reviews and examination practice tasks
- the CDLI Guidance Room to provide support in study skills, time management and test-taking strategies
- online tutoring (www.cdli.ca/tutoring).

Supporting Students (CDLI)

The *e-Teachers* or virtual teachers are recruited from the existing teaching population. At school-level, the principal plays a key role in selecting and registering the students for online courses. They are supported by a *mediating team (m-Team)* and *mediating teachers (m-Teachers)*. These groups are viewed as key to ensuring a quality learning experience at the school level and the *m-Team* consists of

a minimum of 3 people – the principal, a technical support person and a teacher to coach and mentor the students. Their role, similar to that of the *e-Dean* in New Zealand, is perceived as being crucial to ensuring students have an engaging learning experience.

> Online teaching will not be successful without onsite teacher support. At the school level, online students are supported and supervised by a mediating team (*m-Team*) or a mediating teacher (*m-Teacher*).
>
> *(Saqlain, 2017)*

The *m-Teacher*:

- Supervises distance learning students while they engage in online activities
- Monitors the progress of distance-learning students in relation to the completion of assignments/exams on time
- Follows-up with students experiencing difficulty to ensure optimal participation
- Accepts grades and reports from the *e-Teacher* and ensures these are entered in the student term/end-of-year report cards
- Provides assistance to students who encounter difficulty in using asynchronous communication tools
- Includes online students on the teacher's class list and follows-up on absences from class in line with the practice implemented for students who are taught by the *m-Teacher* in regular face-to-face class groups
- Meets, as requested, with the *e-Teacher,* web-based facilitator, high school program specialist
- Assists staff in acquiring the skills necessary for accessing web-based professional development opportunities in consultation with the CDLI, Virtual Teachers Centre of the NLTA and the School District
- Participates in district pilot course implementation team meetings upon request
- Participates in provincial in-service and forums upon request.

(Adapted from Barbour and Mulcahy, 2004)

Interestingly, in Newfoundland and Labrador (NL), the *m-Teacher* does not:

- Provide regular instruction or tutorial assistance
- Provide technical troubleshooting related to the CDLI workstation, network hardware or the operating system, as this is performed through a central helpdesk.

The *m-Teacher's* role is very much focused on administrative duties and on monitoring student engagement with the course. As in New Zealand, the *m-Teacher* plays a key role in ensuring students have a teacher in their own school to support their online learning. The *e-Teacher* is therefore responsible for designing and teaching all aspects of the course and they are supported by the *m-Team* at the home school.

Assessment (CDLI)

The final year of high-school, Grade 12, is a key year for students as they are preparing for several high stakes terminal exams. These exams are paper based, and students complete them in examination centres. In preparation for these exams, students submit their homework by scanning in their handwritten material to Dropbox and they receive their marks and feedback using a similar approach.

Learner Responsibility (CDLI)

A student participating in a virtual classroom remains on the school register of their home school. As they participate in a course being offered by CDLI, there is a shared responsibility for the student, between CDLI, the *e-Teacher* and the home school. For example, issues such as behavior management are primarily an issue for the principal in the home school who has ultimate responsibility for their students.

Both the New Zealand and the Newfoundland Labrador models are virtual-schooling models, and they are designed to supplement the existing curriculum for students who cannot access certain subjects in their own school. They have both grown out of a correspondence course culture and provide learners with a blended-learning experience, which is a mix of synchronous and asynchronous learning. The *e-Teacher* in both models is responsible for teaching the online course and students are supported in their home school by a mentoring team. Both models use internet-based tools to provide online-learning experiences, as opposed to stand-alone video-conferencing technology, where the teacher is interacting live with his/her students at all times

Australia - CEWA

A group of Catholic schools in Western Australia (the Catholic Education Western Australia (CEWA) school system)[9] are embarking on the rollout of a virtual-schooling network [ViSN] for students in their system. In 2017, 10 of the system's rural and remote schools offered "few or none of the year 11-12 courses required for university admission" (Cavanaugh and Roe, 2018). A number of these schools had provided courses to their students via the government distance-education programmes, but these were "not found to apply best practice in engagement and transactional distance for secondary learners" (Ibid, p. 4). Furthermore, the schools estimated it would cost over 200,000 dollars to offer a full programme to the 125,000 students that required it. Thus, a consortium of Catholic schools in Western Australia developed a virtual school to expand students' participation in an effective and appropriate education, which they could access in their own community. Currently, the consortium consists of 10 schools and they are seeking to expand the initiative by inviting other Catholic schools within the state to join.

Home-grown Virtual School Model (CEWA)

According to CEWA, the key ingredients for a successful virtual school include purpose-built course content, skilled virtual teachers and program oversight that includes enrolment, orientation, policy and quality assurance (Ibid, p. 5). CEWA decided to invest in their own teachers, rather than buy into a virtual programme from outside, so teachers would be upskilled to design and deliver an in-house programme that was informed by best practices in online learning. Teachers were nominated by their principals because they were subject specialists and effective teachers who had an interest in learning to teach online, and they committed to the implementation of an intensive year-long program.

[9] Catholic Education Western Australia, www.ceo.wa.edu.au

During Year 1, the goal was to establish program policies and practices to launch the e-learning environment; to develop the teachers' capabilities in online teaching; to launch an external course review; to enrol students in the various courses; to take on board and train a school site mentor in each school; and to provide orientation modules to each student. CEWA's programme was heavily influenced by the work of the International Association of K-12 Online Learning, iNACOL[10] based in Washington DC. During Year 1, the development year, the teachers participated in a range of professional development activities to develop their virtual pedagogical skills and to design their courses, which they would teach the following year.

Teacher Professional Development (CEWA)

The teachers received limited release time from their full teaching schedules outside of eight days of workshops. They attended workshops for 2 days in each quarter of the year between March and October with virtual-school program leaders and system leaders who had experience in learning design and online learning. They worked together during the year in an online professional learning community (PLC) and this work was facilitated by the program leader and other system leaders. The PLC was guided by the International Society for K-12 Online and Blended Learning (iNACOL) National Standards (Ibid, p.6).

The goal for teachers during the development year was to build relationships in their community of practice, so they would:

- learn about facilitative virtual pedagogy
- develop engaging course-design principles
- learn about the digital-learning environment
- develop the first module of their online course
- become confident advocates and representatives of their program in the state.

The teachers were recruited from 8 of the 10 schools and they had an average of 11.8 years of classroom teaching experience, ranging from 1 to 31 years. Most teachers had no experience of online learning programmes and their experiences ranged from extensive to none. They were profiled in advance of commencing their first virtual professional-learning session, using the iNACOL National Standards for Quality Online Teaching[11]. Teachers participated in 64 hours of scheduled professional learning and many hours of informal PLC work over six months, and they worked independently to develop their digital content and to design their courses. At the end of the six months they once again completed the iNACOL Online Teaching Scale.

[10] iNACOL, www.inacol.org/our-work

[11] iNACOL National Standards for Quality Online Teaching, https://www.inacol.org/resource/inacol-national-standards-for-quality-online-teaching-v2

Job-Embedded Professional Learning (CEWA)

Each of the ten courses developed by the teachers was reviewed twice at the end of the year, in terms of content and design. The content review was conducted by an educator external to the virtual school program who had subject-matter knowledge in the specialist domain of the course. The virtual design review was conducted by an educator external to the program who had experience in quality online courses and learning design. The use of a quality course-design rubric, built awareness among teachers around effective course-design benchmarks, while they designed and redesigned their courses. Secondly, the review process provided each teacher with personalised formative feedback, so they could refine their courses prior to rolling it out to students.

Teachers participated in a job-embedded year-long professional learning community designed for virtual teachers, where they built up a new range of pedagogical and course-design capabilities. CEWA reported that teachers grew in their perceived skills in all areas, indicating confidence brought about by awareness and use of the iNACOL standards during their professional-learning experiences. Some standards, such as online learning facilitation and moderation, remained low and these have been identified as a priority for the PLC in the coming year.

Partnership Approach (CEWA)

The virtual school network will offer 10 courses to 100 students during the 2018 school year. CEWA plans to make the course content and materials available to schools in 2019, once anticipated demand grows. CEWA is implementing a partnership model which involves working with the following organisations:

- iNACOL is the main international professional association for K-12 online learning, and is a source for guidance, standards, expertise, and professional learning.
- Microsoft ViSN has identified OneNote[12], Teams[13] and Skype plus Cortana Analytics and Bots[14] for delivery of online learning. CEWA has been working with the education engineering groups for both of these products.
- CEWA has been working with CLANED[15] an AI-enhanced digital content repository and eportfolio platform.
- The education system in Finland has partnerships with CEWA and has expressed interest in their online courses.
- CEWA's partnership includes Teaching Fellows in Notre Dame University, one or more of whom can support the ViSN.
- Michigan Virtual[16] and Michigan Virtual Learning Research institute (MVLRI)[17] on both online teacher and mentor professional learning experiences, including the sharing of content from CLANED and research on the ViSN model.

[12] OneNote, https://support.office.com/en-us/article/video-what-is-onenote-be6cc6cc-3ca7-4f46-8876-5000f013c563
[13] Teams, https://www.microsoft.com/en-us/education/products/teams/default.aspx
[14] Microsoft Cognitive Services, https://docs.microsoft.com/en-us/azure/bot-service/bot-service-concept-intelligence?view=azure-bot-service-3.0
[15] CLANED online collaborative platform, https://claned.com
[16] Michigan Virtual, https://michiganvirtual.org
[17] Michigan Virtual Learning Research institute, https://mvlri.org

The Student Experience (CEWA)

Each student is timetabled for 5 class periods each week. Four of these sessions are asynchronous using Microsoft Teams, Class Notebook and other digital content such as video in Microsoft Stream, or other resources in their CLANED platform. Students and teachers can message, chat or call each other using the Teams collaboration platform. On the 5th scheduled class period, teachers meet with their students synchronously using a Skype call in teams. **Figure 5** below provides a conceptual view of the learning environment.

Some schools have created a designated space in a classroom or library for their virtual-school students and teachers, while others place students in a classroom during another class (in which case they work independently with headphones if needed). In addition, CEWA has asked each school to provide participating teachers and students with a Windows or Mac laptop.

Figure 5: Conceptual View of CEWA ViSN learning model

In addition, each school with virtual students is required to have an onsite *e-mentor*, who was trained, and is responsible to monitor progress, support students, liaise with schools, teachers, and provide report data to schools.

Scotland - e-Sgoil

Nearer to home Scotland has established a virtual school or e-Sgoil.[18] The e-Sgoil was established in August 2016 with the hub building opening the following December. Funding for the initiative was provided by the Scottish Government and Bòrd na Gàidhlig. The service is located in the Western Isles (Scottish Gaelic: Na hEileanan Siar) and the project was initiated to deal with a real problem, the loss of a Mathematics teacher on the island of Barra. The students in the small island's secondary school urgently required a teacher. The e-Sgoil responded immediately to the school's need, located a teacher and provided training for the teacher on the use of the video-conferencing system. The service is part of the Western Isles Department of Education and Children's Services[19] and its aim is to:

- provide a wider and more equitable choice of subjects for pupils across all secondary schools in the Western Isles
- support the expansion of Scottish Gaelic-medium education locally and nationally
- develop a network of staff who are able to deliver online learning in all subject areas throughout Scotland
- engage with Comhairle nan Eilean Siar's workforce-planning strategy in relation to adult learning and modern apprenticeships.

Thus, e-Sgoil has a wider remit than the virtual schools in New Zealand, Canada and Australia in that it has a specific remit around the promotion of the Scottish Gaelic language and to support workforce planning. However, one of its core aims is to address the challenges of living and teaching in a rural location by expanding the range of curriculum subjects for students living in the Western Isles. There are several secondary schools in the region, with enrolments ranging from 50 in Barra to approximately 1,000 in Stornoway. In addition to supplementing the local curriculum for students attending schools in the Western Isles, e-Sgoil also offers Gaelic-medium education locally and nationally. One of the first projects undertaken was to supply Gaelic lessons online to a school in Aberdeen. The service worked well and now several other schools nationally are connecting with e-Sgoil to access Gaelic lessons for their learners. Furthermore, they are now using this approach for a range of other subject areas, including Computer Science. In the case of Computer Science, this has helped address a national teacher shortage issue, where schools do not have a specialist teacher in this area. E-Sgoil has recruited a specialist e-Teacher for Computer Science who can now teach students residing in different locations in Scotland.

E-Sgoil is housed in an old schoolhouse that has been renovated into an e-learning hub in Stornoway on the Isle of Lewis. Initially, a one-year timeframe was assigned to set up the programme, but the online programme was operational 6 months from the project commencement date. The small e-Sgoil dynamic team has displayed a commitment to solve problems and to learn as the project evolves as reflected in the activities undertaken to date.

The e-Sgoil Ethos and Learning Model

The ethos of the e-Sgoil initiative is not to replace teachers but, like New Zealand, Canada and Australia, to provide students, particularly those in the Western Isles, with an expanded curriculum. In addition,

[18] e-Sgoil, http://www.e-sgoil.com

[19] Education and Children's Services Department, https://www.cne-siar.gov.uk/cnes-departments/education-and-childrens-services

the team is tasked with the promotion of the Gaelic language in Scotland and they are funded accordingly. Their learning model is about putting teachers in front of students and hence their decision to use video-conferencing. The model focuses on building strong relationships between the teacher and the students and they are finding that this takes longer to do online. To assist in building relationships, they recommend that the teacher meets his/her students in advance, where possible. This is similar to the New Zealand model where the teacher meets the students twice yearly and numbers are kept small so that the e-Teacher is only engaging with 4-6 learners at any one time.

When e-Sgoil was announced, many were of the view that it would offer a learning solution like that of the Open University and other higher-education institutions, where learners would interact with large amounts of content on a LMS in their own time. E-Sgoil has resisted the use of a LMS system, such as Moodle or D2L, where students would access content in their own time. Instead, learners are timetabled into a class where they interact live with their teacher. The *e-Teacher* is not teaching a face-to-face class in a regular classroom, they are instead in a separate room working with their students via a video-conferencing tool, Vscene[20] . Thus, the teacher and his/her learners are timetabled to be online together at the same time and the model does not use any form of asynchronous learning at this stage. The teacher and students can interact with each other using an array of existing tools that are provided by the Scottish government to schools. Typically, the teacher has students from a number of schools in his/her virtual classroom.

Technology Solution (e-Sgoil)

E-Sgoil is using a range of low-level technology that includes tools and services that are freely available to all Scottish schools. One of the key elements of this solution is Glow[21]. Glow is Scotland's nationally available digital environment for learning and it provides access to several web services and procured resources that allow users to create, collaborate and innovate. As part of Glow, schools have access to Office365 and to Vscene. In addition, the solution utilises affordable document cameras and other tools, such as interactive whiteboards, that are commonplace in most schools. The e-Sgoil team made a strategic decision not to invest in expensive technology and the hub school uses the same technology as all of the participating schools. The e-Sgoil team reported limited technical issues, other than firewall issues in the participating schools, and these have caused some interference with Vscene. However, the issues experienced are minimal, and the service is robust and secure.

Teacher Support (e-Sgoil)

Since its inception, e-Sgoil has provided customised support for their participating *e-Teachers*. Initially they worked with three *e-Teachers*, the majority of whom had no issues in using the technology and the online learning environment. Where issues were experienced, the team immediately intervened, carried out an assessment to identify the issues experienced, and implemented a just-in-time training programme. A booklet was developed outlining the e-Sgoil pedagogical approach, which is shared with all staff in advance. The e-Sgoil team estimate that it only takes about 20 hours to get a teacher ready to teach online. e-Sgoil provides the necessary training so a teacher can teach online. There is no

[20] Vscene is a video-conferencing tool and service currently provided free of charge to educational institutions via JISC. However, the service is due to move to a paid-for-service from March 2018.

[21] Glow - Digital Learning for Scotland, https://glowconnect.org.uk

delay between a teacher receiving their training and their engagement with their students online. It is very much a just-in-time professional development approach.

When identifying teachers to participate in the project the e-Sgoil team focus on finding good teachers and not on technology-competent teachers. They are of the view that if you find good committed teachers they will find a way to use the technology so that learners are engaged effectively online. They typically work with teachers in the Western Isles district, but when they are unable to find a specialist teacher they may re-hire a retired teacher.

Recently the e-Sgoil team has started to use the video-conferencing technology to provide teacher professional development experiences to teachers in the Western Isles. They have used the system to link teachers in the region with experts on the mainland and in other areas. It is already paying off in terms of reducing the cost of offering professional development opportunities for teachers, by reducing costs such as travel and substitution. The system is also providing teachers with equitable access to quality professional development, which was not feasible in the past.

Examples from Ireland

Several successful distance-learning projects have been implemented in the Irish education system in recent years. Most of these projects have seen schools coming together to offer a greater number of subject options to students in a locality. Such initiatives have included the teaching of Chemistry at a distance between Dunshaughlin Community School and St Fintina's post-primary school (now Coláiste Clavin) in Longwood, Co. Meath[22]. This was a successful experiment between two schools in order to offer Leaving Certificate Chemistry via video-conferencing to a small number of students in Longwood. Another similar project connected St Joseph's, Ballybunion with Mercy Mounthawk, Tralee,[23] and it enabled students in Ballybunion to study a range of subjects which included agricultural science, history, chemistry and physics using video-conferencing technology. More recently, two Dublin schools Coláiste Bríde, Clondalkin and Presentation post-primary school, Warrenmount also used video-conferencing to connect two Honours Mathematics classrooms, so that students in Warrenmount could take the subject for their Leaving Certificate. Unfortunately, there has been little or no research conducted on these projects, other than an internal report completed on the Coláiste Bríde/Warrenmount Connected Classroom Project.

The Warrenmount Connected Classroom Project[24] was a Schools' Broadband Exemplar Project, funded by the Department of Communications, Energy and Natural Resources. The project enabled Warrenmount to offer a dedicated higher-level Mathematics class, rather than teaching a cohort of higher level Mathematics students in a mixed class, where teachers attempted to teach both ordinary and higher-level Mathematics to the same group. The project involved the provision of instruction from one school to another – from a teacher located in Coláiste Bríde, who was teaching her own class, to a group of (initially 6 then 4) students in Warrenmount. The students in Warrenmount joined in with the

[22] Meath VEC example, https://www.independent.ie/life/family/learning/beam-me-up-children-ms-smith-is-on-screen-number-one-26587651.html

[23] Kerry distance learning example, https://www.independent.ie/regionals/kerryman/news/distance-learning-initiative-may-set-pattern-for-schools-nationwide-27403845.html

[24] The Schools Broadband Exemplar Project, https://www.thedigitalhub.com/projects/the-schools-broadband-exemplar-project

class in Clondalkin via video-conferencing and became part of their class. The sessions were live and were highly dependent on the teacher in Clondalkin involving the students in Warrenmount.

The two classrooms were connected so that instruction taking place in one location could be equally effective in a second geographically remote location. The teacher in Coláiste Bríde continued to teach the class in Clondalkin and attempted to integrate the smaller cohort of students as best as possible. The project found that this proved challenging for the teacher and the students, both in Clondalkin and Warrenmount. These challenges included the reliability of the technology, the need to redesign the teaching and assessment activities for students and the increased workload for the teacher. While the project was addressing a real need, it was not sustained, and this has been the case in other video-conferencing projects also. Connecting two classrooms using video-conferencing technology works from a technical perspective, but it requires teachers to adapt and ultimately re-invent their instructional practices. The Warrenmount project found that a connected classroom strategy requires teachers to have participated in professional development activities, so they can better support learner interaction, particularly those students learning at a distance. Ultimately, students are learning at a distance and this requires a different instructional approach than teaching using face-to-face strategies in a physical classroom.

Conclusions Drawn from Case-Studies

The review has found a range of models where students are successfully learning at a distance, via the internet. These practices are most advanced in New Zealand, Australia and Canada where internet technologies are used to provide virtual schooling to students. Typically, these models are providing students with access to courses not available in their own schools, thus supplementing their existing subject course choice. Virtual schooling has a long tradition in these countries and they have developed structures and supports to ensure students can easily participate in these online courses, once they have an internet connection. In Ireland and Scotland, there have been several experiments with distance learning using video-conferencing technology. Though previous Irish experiments proved successful in connecting classrooms, most have not been continued because of other factors such as teacher workload. In Scotland, video conferencing technology is used to provide supplemental education to students in remote areas and their online learning project is still relatively new. Thus, the internet-based virtual schooling model is the more established model and seems to have the greatest possibilities in providing a sustainable learning experience to students in rural post-primary schools in the Gaeltacht. This model provides a blend of live teaching and self-study to the students.

The blended model provides students with live access to their teacher, using a stand-alone video-conferencing suite or a Web alternative such as Skype for Business or Google Hangouts. Students interact live with their teacher during a pre-determined set of class periods and then work on their own or with their peers during other periods. The models vary between countries, but the inclusion of asynchronous sessions creates an expectation that students will take a greater responsibility for their own learning, rather than expecting the teacher to do all the work. Such models place a heavy emphasis on students actively participating in their own learning and in co-creating knowledge and understanding with the support of their teachers and fellow students. Furthermore, these models provide supports to the students learning at a distance, by providing them with an e-Mentor and a designated space to learn. The nature of the structures has evolved over time but in all cases, it is recognised that students need to be supported within their own school to effectively learn at a distance.

Section 3: Essentials of Good Online Learning

As noted earlier, there is a lack of large-scale rigorous research undertaken on the performance of students in a variety of online and blended-learning settings (Barbour, 2017). In the main, the research available tends to be based on small samples, unique instruments, and non-normed comparisons. Furthermore, the research on online blended learning in the context of schools is very limited, when higher-education studies are excluded. However, despite these limitations, there is emerging evidence of a set of good practices that should underpin blended online-learning programmes for schools. This section outlines a number of these practices that should be taken into consideration when designing an online blended-learning programme for post-primary schools in the Gaeltacht.

Student Population

The international review undertaken showed that the majority of students participating in online blended programmes are the more academically motivated and higher-achieving students. They are typically self-directed, self-disciplined and independent learners who can read and write well and who have a strong interest or ability in the use of technology (Haughey and Muirhead, 1999 in Barbour, 2017).

Local School Support

There is growing evidence that students who participate in blended online-learning programmes, where they are accessing supplemental courses not available in their own school, require local support. This support is typically an individual known as a mentor or a facilitator, or in the case of NetNZ, an *e-Dean*. Their role is "to interact with and supervise students during online class time, provide technical troubleshooting, distribute and facilitate materials and activities sent by the online teacher or program, provide assistance with some content items and student study skills, and communicate with online teachers and parents" (Barbour, 2017; p. 44).

Blended-Learning experience

The most successful models contain a mix of live teaching and self-directed learning. In New Zealand and Australia, students typically have one live session with their teacher and then four other sessions where they work on their own or with other students. The teacher may engage with them during these asynchronous sessions, but there is no live teaching to the entire group. If a student is experiencing difficulty, a one-on-one session can be arranged with their teacher to discuss any difficulties experienced. This model places a responsibility on the student to actively engage in his/her own learning.

Role of the Teacher

The teacher's role is key to ensuring that students are engaged during their online course. The *e-Teacher* must design an online course that will enable students to develop an understanding of the subject matter content. The role of the teacher is more of a facilitator in this model and strategies that may

have worked well in a face-to-face classroom context may need to be adapted or changed for an online environment. Thus, the teacher needs to design learning activities where the students have opportunities to create their own understanding by interacting with the content, their peers and the teacher.

Role of the Student

Typically, students in some classrooms may be quite passive in their own learning and outside of engaging directly with their teacher and the learning content (i.e. the textbook), they rarely engage in critical discussions or meaningful learning activities with their classmates. Online learning expects the student to be more actively engaged in their own learning and the New Zealand, Canadian and Australian models expect students to take responsibility for their learning and to actively participate in group discussions or learning activities with their peers.

Professional Development for Teachers

Online teaching is not the same as teaching in a physical classroom. Teachers need to adapt their practice to teach online and therefore they require professional development to help them understand how online teaching and learning differs from face-to-face. Ideally, teachers should experience online learning as a learner and therefore much of the professional development activities should take place online. The professional development should be job-embedded, as in the Australian case, and it should focus on the content teachers will use with learners and on the learning activities they will design. Ideally, a group of teachers should participate in such professional development, so that there is a community of practice, where they can interact with colleagues and develop their professional practice over time. Professional development should be ongoing, and it should align with any issues teachers are encountering in their practice. In this way, the creation of a professional learning community (PLC) can be a very effective way of supporting teachers to develop their practice over time. The professional learning experiences for teachers should ultimately mirror the model of learning that the students will experience in the virtual-school environment.

Building Learning Relationships between Teachers and Students

The role of the teacher in building strong learning relationships has been identified as key in all the case-studies. Finding the right teachers is key to ensuring that students have a good learning experience. Building learning relationships extends beyond the *e-Teacher,* the person teaching the students, to other teachers in the students' own school. The *e-Teacher* has a key role to play in designing activities that will engage the students and will provide them with opportunities to participate in discussions and to develop relationships with other students. However, the *e-Dean* is equally important in ensuring students are engaged and feel supported in the school. It is also important to build relationships with parents and this is a key role for both the *e-Teacher* and the *e-Dean*, so they are regularly updated on their child's progress and learning activities.

Online Assessment

Assessment, both formative and summative, is the key to good instruction and is an essential part of any learning experience. The assessment of students' learning is also crucially important in virtual online education, as it provides a window into how a student's understanding is developing. Where students are exposed to a mix of synchronous and asynchronous learning, there are multiple opportunities for formative assessment. When students are working asynchronously, either on their own or in a group, their work can be shared with the teacher for feedback. Alternatively, students can create work on paper and it can be submitted electronically via a scanner or a document camera. Ultimately, students should have an e-portfolio where their work is stored and where teachers, and even parents, can view it and provide feedback. Summative assessment, such as terminal exams or state examinations, can be undertaken in a physical location and these would be supervised in the traditional way. This is the practice in Newfoundland and Labrador where students sit exams in the traditional way, though their learning took place online.

Section 4: Recommendations for Gaeltacht e-Hub

The evidence suggests that virtual learning can expand curriculum choice for post-primary students located in smaller schools through the provision of online or virtual-learning experiences. The creation and rollout of such learning experiences tends to be unique to each country setting and requires a set of structures and supports to enable students to engage in a quality learning experience. To date in Ireland, the use of distance-learning models has typically involved two schools, one large and one small, where the larger school offers a subject to the smaller school. The Irish experience has worked well in most cases, but such models are rarely sustained over time. Therefore, in this pilot there is a need to consider how the best practices, outlined in Sections 2 and 3 of this report, can inform the creation of a virtual school experience, where students from several post-primary schools attend. This differs from previous models which connected two classrooms via a video-conferencing connection and only students from those schools attended. This virtual school experience is referred to as the Gaeltacht e-Hub.

The Gaeltacht e-Hub Pilot Project will draw on the experiences of similar e-learning initiatives and practices globally, where students supplement their existing curriculum with online courses for subjects not available in their own school.

The Gaeltacht e-Hub would support the provision of a range of virtual courses through the medium of Irish to Leaving Certificate students located in any of 28 post-primary schools participating in the Gaeltacht School Recognition Scheme. The hub would not be housed in a particular school but would in effect be a virtual community of schools, where any of the participating schools could provide or receive online Leaving Certificate subjects. Such a model might initially involve the provision of one subject and the participation of 3 to 4 schools to prove the model concept underpinning the pilot project. This model could grow organically over time as *e-Teachers* are identified and the demand for additional subject arises.

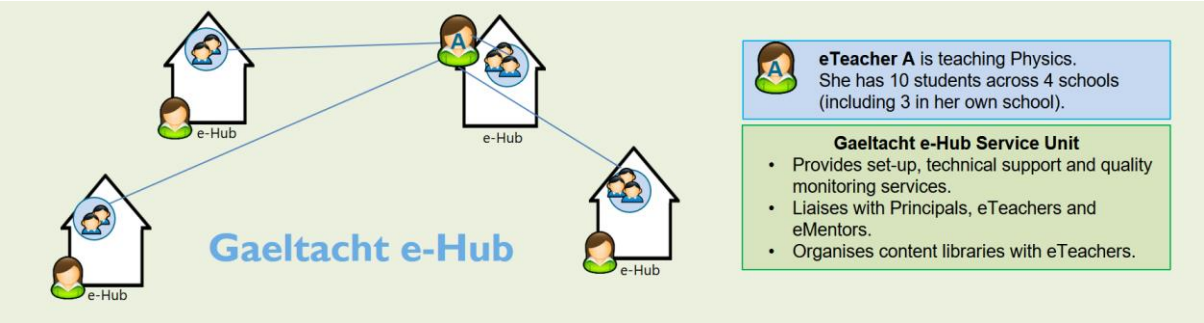


Figure 6: Gaeltacht e-Hub pilot model involving 4 schools

The Gaeltacht e-Hub would be virtual and, depending on a teacher's location, courses would be delivered from any of the participating schools in the virtual-learning network. The creation of such a dispersed model allows teachers in any of the participating schools to participate in the project. Initially, it is envisaged that the e-Hub would involve one teacher teaching one subject to a class group

distributed across 3 to 4 schools. Each school, similar to Scotland, would have a designated e-Hub within the school, where students would go when timetabled to participate in their virtual class.

The *e-Teacher* would be assigned a class group of students who are located across a number of schools. The participating schools would co-ordinate their timetables so that this class group is available to participate in their virtual classes at the timetabled times. This would be negotiated and agreed between schools prior to the commencement of the school year. In the scenario illustrated in **Figure 8,** the *e-Teacher* is teaching Physics to a 5th year virtual class, "*Fuinseog*". In *Fuinseog*, there are 10 students, and they are dispersed across 4 schools, including 3 students in the *e-Teacher's* own school. *Fuinseog* is timetabled for 5 class periods per week which includes a double class on Thursday.

At the assigned times, the students in *Fuinseog* go to the e-Hub located in their own school. They log into the Gaeltacht e-Hub to connect with the *e-Teacher*. They can see the *e-Teacher* and if required, can also see the other students located in the three other schools. The *e-Teacher* interacts with the students live and, similar to a real-life class, students can ask questions, engage in discussion or demonstrate a problem. The document camera can be used for students to display their work or to view paper-based reference material. They can use the conferencing whiteboard facility to work through a problem and involve the students actively in a range of teaching and learning activities.

Teaching the Subject

The *e-Teacher* will be responsible for teaching the 10 students and he/she will design a set of learning experiences that will consist of synchronous and asynchronous learning activities. He/she will present new learning material to his/her students through a mixture of pre-recorded lessons and live sessions. During the pre-recorded sessions, students will engage with the lesson content on their own or with other learners. They will be presented with a series of relevant learning tasks designed to assist them in developing an understanding of the material.

The live sessions will focus on teachers clarifying any issues that students may have encountered, as opposed to teachers delivering content '*live*' to their students, as is the case in the face-to-face classrooms. Teachers will interact with the entire group using synchronous and asynchronous discussion strategies, which will provide students with an opportunity to clarify any misunderstandings or misconceptions they might have. Students are then assigned to work with their fellow class mates to solve problems and to deepen their learning. In this way the students are expected to take more responsibility for their own learning and the teacher's role becomes more of a facilitator of learning.

Formative Assessment of Learning Requirements

Formative assessment will be a critical element of the e-Hub learning experience. Teachers will assign students a range of tasks which they will be required to complete on a weekly basis, either on their own or with fellow students. It is expected that there will be a mix of formative assessment tasks and these will vary depending on the subject. Students will be expected to interact with new content and to respond to written questions in advance of meeting their teacher. These questions might be contained in an online virtual learning environment or they might complete them using pen and paper and share them in advance. Furthermore, teachers would be expected to design assessment tasks that require students to work with their classmates and these would be completed during online class sessions. Formative assessment will be a key feature of the virtual school experience as it will help the *e-Teacher* to adapt their teaching approaches to meet the needs of their students.

Teacher / Student Interaction and Discussion Opportunities

The research on online learning is consistent in the promotion of a social constructivist learning model where teachers and students co-construct understanding, learning and knowledge together. This model requires the teacher to re-design their learning activities so that learners can actively participate in learning, as opposed to passively receiving content that is presented to them. The model will provide students with multiple opportunities to interact with their teacher or peers in group discussions or, if needed, during one-on-one virtual meetings. Discussion should be to the fore and it will be the role of the teacher to design and lead such discussions, so that discussion is used as a teaching tool (Brookfield and Preskill, 2005).

Discussion may be synchronous, where people are speaking to each other via the microphone live, or it may be asynchronous where teachers or students use text to discuss an issue in their own time. The live discussion can occur between the teacher and the entire group or it can occur when smaller groups of students are placed in break-out spaces where they can discuss an issue. Both forms of discussion will be key to building a robust learning community. It will be important to ensure that students are engaged and feel part of a learning community where their teacher and/or classmates are based in a different school.

Peer Discussion Interactions

The online learning model places a premium on learners taking responsibility for their own learning and for co-constructing their own learning. Thus, the teacher will need to rethink how they design learning activities, so that the learners have ample opportunities to interact. This will require giving students a voice, so they can interact with each other to discuss the content they are engaging with, to solve problems and to raise issues that they do not understand. This may take time to develop and students may need to be scaffolded initially to enable them engage in such practices.

Group Activities

Group activities are a key element of online learning, as they provide opportunities for students to interact with their peers and to form a learning group. Group activities may involve students solving a problem that is posed by the teacher. Through interactions with the teacher and their fellow students they have opportunities to develop a social presence and to enhance their own understanding of the topic or issue they are working on. Students may need to be scaffolded to work in groups and engagement in such activities has the potential to develop a real learning community where the students and their teacher are actively engaged in the teaching and learning process.

Creating a Community of Online Learners

International best practice shows us that students should have a mix of face-to-face and asynchronous learning activities. Teachers will need to actively develop an online learning community among their students by providing opportunities for interaction among students from the start. This may include bringing all the students together in advance of the first online session where they get to meet their classmates and their teacher, similar to the NetNZ model. Teachers will need to provide opportunities regularly to engage with their students directly, either in whole-group discussions or in one-to-one interactions. Furthermore, the students will need to be supported in their home school, by an *e-Mentor,* who meets them regularly and ensures that they are interacting with their *e-Teacher,* their lesson content, and their fellow students.

Ultimately the goal for the Gaeltacht e-Hub will be to have several *e-Teachers* teaching virtual classes at the one time. For the pilot, it is proposed that one or two e-Teachers will be selected and support structures developed for one subject area, so that the approach can be tested before modifying the model and rolling it out to other areas of the curriculum. In addition, Year One should be viewed as an active experiment where the model is constantly being reviewed and modified, where necessary, to ensure the best experience for learners and teachers. The model will be informed by best practice in other countries and will borrow elements that will fit well with the Irish educational context. However, as this is a pilot, it should have a flexible design so that it can adapt and respond to issues, as they arise. Year One has the potential to provide an enormous amount of learning on the design, the rollout and sustainability of the model. Hence, a preparatory phase needs to be built into the pilot from the outset.

Gaeltacht e-Hub Model - A Possible Scenario

Where virtual schooling has been successful, it has involved a network of schools that have identified a need to offer a subject or subjects to students in their school that they are not able to provide locally. The network of schools should consist of schools that are interested in offering subjects to other Gaeltacht schools and who have a need themselves to offer supplemental subjects to their students. **Figure 7** depicts how such a network or consortium might work, with 10 participating schools and of these, 4 schools are teaching Physics, Chemistry, French and Home Economics via the Gaeltacht e-Hub.

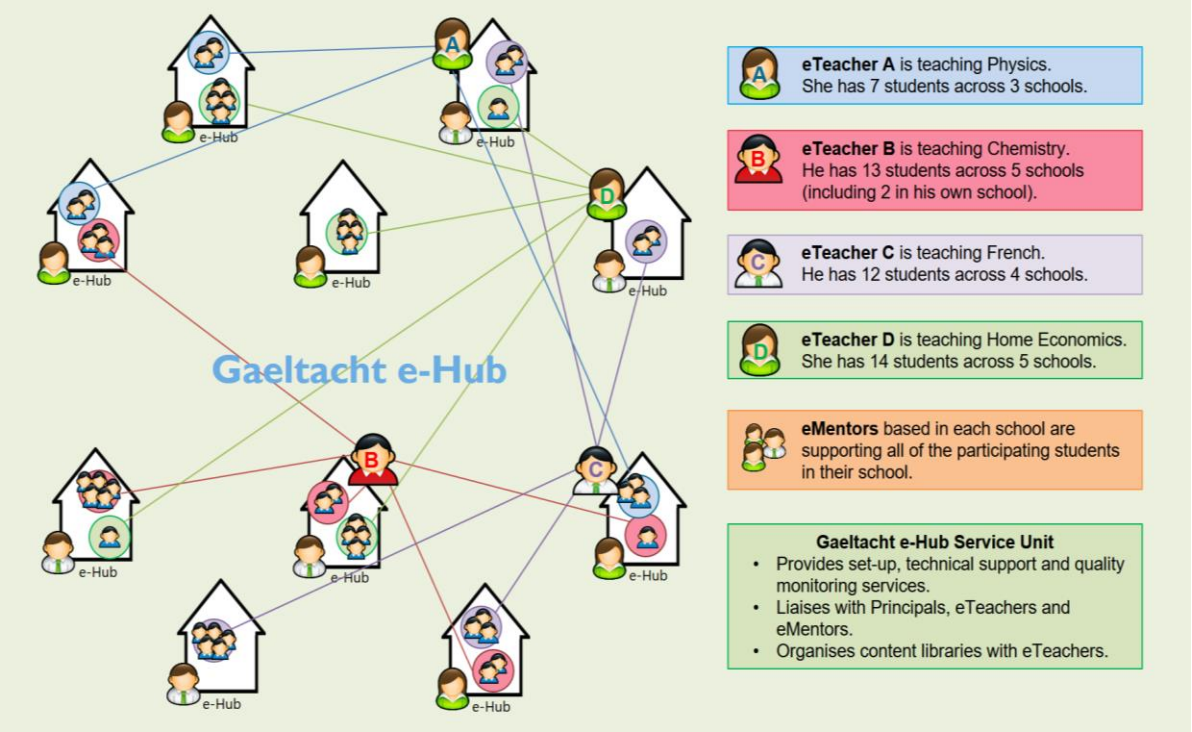


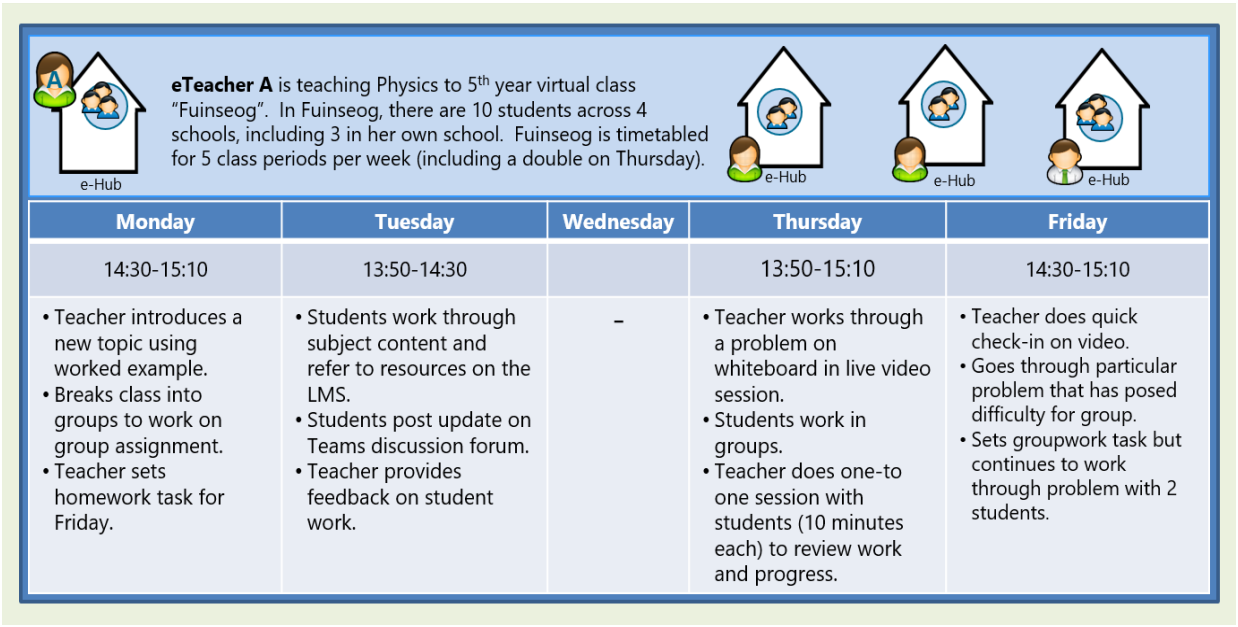
Figure 7: Illustrative Gaeltacht e-Hub model involving 10 schools

Each of the 4 schools has an *e-Teacher* who is based in the school and, in addition to their face-to-face teaching duties, are teaching an online course. The *e-Teacher's* students are drawn from across the 10 schools and this varies depending on the subject area. The *e-Teacher* develops the course material in advance and they interact with their students via the School e-Hub, a room or a space dedicated to online learning, in their own school. On occasion, as in the case of Chemistry, the *e-Teacher* may also have some students from their own school and they too will be present in the school's e-Hub. The *e-*

Teacher will be provided with additional time to develop and prepare for his/her online classes and he/she will be timetabled for both synchronous and asynchronous classroom sessions with the students.

Each of the participating schools will have an *e-Mentor* who will support the students and ensure they are attending class and that they are engaging effectively with the course. Both the *e-Teachers* and the *e-Mentors* will receive training on the model and on supporting learners effectively online in advance of the pilot project and at regular intervals during the pilot. It is proposed to create a virtual Gaeltacht e-Hub to support the participating schools throughout the pilot (further detail is provided below). The e-Hub will play a central role in supporting the schools to design and implement quality learning experiences for the participating students.

Figure 8 illustrates what a typical week might look like for the *e-Teacher* and his/her students. *E-Teacher* A is teaching Physics to a 5th year virtual class group which comprises 10 students from 4 schools. This group includes 3 students in her own school. The group meets four times a week and each session is timetabled, as outlined in **Figure 8** below. Students are timetabled for a 40-minute period on Monday, Tuesday and Friday, while they have an 80-minute period on Thursday. The teacher is present with the students during each period and students engage in a range of different learning activities that range from teacher-led sessions to students working alone or in groups on pre-assigned learning tasks. In addition to these timetabled periods students can request a one-on-one video call with their teacher if there are any particular issues with which they need assistance. Furthermore, the *e-Mentor* will be working closely with the students to ensure they are engaging successfully with the course materials.



Monday	Tuesday	Wednesday	Thursday	Friday
14:30-15:10	13:50-14:30		13:50-15:10	14:30-15:10
• Teacher introduces a new topic using worked example. • Breaks class into groups to work on group assignment. • Teacher sets homework task for Friday.	• Students work through subject content and refer to resources on the LMS. • Students post update on Teams discussion forum. • Teacher provides feedback on student work.	–	• Teacher works through a problem on whiteboard in live video session. • Students work in groups. • Teacher does one-to one session with students (10 minutes each) to review work and progress.	• Teacher does quick check-in on video. • Goes through particular problem that has posed difficulty for group. • Sets groupwork task but continues to work through problem with 2 students.

Figure 8: Illustrative Gaeltacht e-Hub teaching scenario

This is one example of how students can experience online learning in working through the Leaving Certificate Physics programme. As Leaving Certificate Physics has a compulsory practical component, students will also need to attend a school once a term to carry out experiments. Thus, to enable students meet the full requirements of the Physics Leaving Certificate course, the learning experience for students will include a blend of online and face-to-face learning.

School e-Hub

It is recommended that each participating school identifies a quiet room where students can participate in online classes uninterrupted. Ideally, the conferencing equipment should not be used for other purposes. A resource room or library could provide a good location. The set-up should be conference style with a table capable of accommodating 4-6 students as in **Figure 9** below. The room should have WIFI connectivity to allow students to use their own devices

Figure 9: E-Sgoil classroom setup

School e-Hub Equipment

Having considered the technical set-up in the virtual school models reviewed in Section 2, it is recommended that the e-Hub should have access to the following equipment:

- PC and Monitor
- Web cam
- Desktop-conferencing audio
- Wall-mounted flat screen monitor
- Document camera
- WIFI Router

This equipment should be located in the e-Hub and, ideally, should only be used by the *e-Teacher* and her/his students.

e-Teacher and Student Devices

In addition to equipping the e-Hub, students and teachers will also require their own devices. They may engage with online learning by using laptops, netbooks, tablets, mobile phones and/or other devices. This will depend on the school policy with regard to student devices and what equipment schools already have.

However, it is recommended that each *e-Teacher* is provided with a high-spec tablet device, which has a touchscreen and is pen-enabled. This will allow teachers to prepare lessons outside of the e-Hub and to use the pen functionality on the whiteboard during live sessions.

The PDST-TiE operates purchasing frameworks[25] for ICT equipment and this can be utilised in pricing and procuring the necessary equipment.

Gaeltacht e-Hub Support Unit

A co-ordination unit, the Gaeltacht e-Hub Support Unit, is required to support schools, recruit and support teachers and learners, organise subject content libraries and manage set-up and technical support for each school. The Support Unit would be responsible for ensuring that the virtual learning experience is appropriate in meeting the needs of students and their parents in the particular school(s) where students are enrolled. This could be outsourced as a service until the project is at the stage where it could sustain a co-ordinator and technical-support person. To make a full-time Gaeltacht e-Hub model viable, the e-Hub would need to offer Leaving Certificate courses to learners in several schools across different Gaeltacht areas.

The Support Unit would co-ordinate the following supports to enable learners to access and participate in virtual courses:

- Recruitment of *e-Teachers*
- Provision of technical support to *e-Teachers* and learners participating on virtual courses
- Design and rollout of professional learning experiences for *e-Teachers* and *e-Mentors*
- Design and provision of virtual learning courses/materials for students and their parents
- Provision of ongoing support and communication will all those involved in the e-Hub.

International best practice has shown that virtual schools, particularly that involve more than two schools, require co-ordination supports to ensure the quality of the learning service. The provision of such supports is important for successful implementation and sustainability.

Virtual Learning Environment

Virtual learning can take place in many different ways and there is no-one-size-fits-all approach. The case studies in Section 2 confirmed that the majority of virtual schools use a virtual learning environment to support asynchronous learning. The only exception to this model, at present, is e-Sgoil in Scotland. Virtual learning environments have the capability to support student collaboration, the submission and correction of homework and access to content (both teacher-generated and materials produced by publishers). The review undertaken showed that the CEWA model in Australia, which is the newest model, uses Office 356 to provide a range of services to teachers, students and parents. The majority of the schools potentially involved in the Gaeltacht e-Hub pilot already have access to these products and thus a similar approach to CEWA is recommended.

[25] PDST-TiE Purchasing Frameworks, http://www.pdsttechnologyineducation.ie/en/Technology/Purchasing-Frameworks

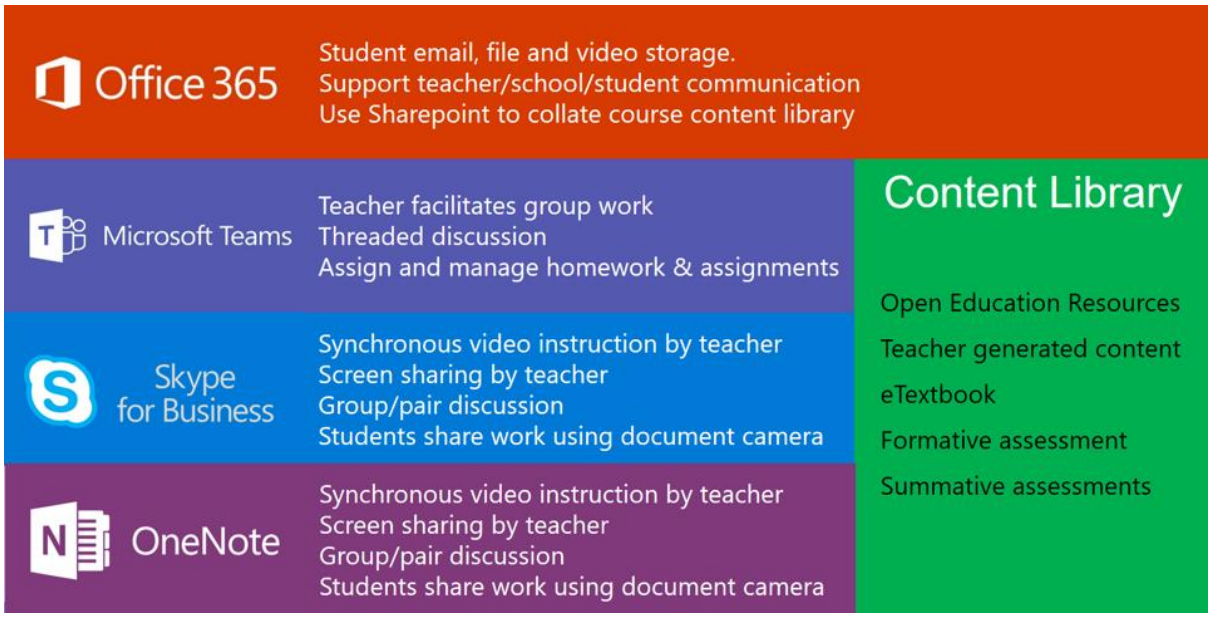


Figure 10: Proposed VLE solution based on CEWA Model

Section 5: Key Roles and Procedures

In addition to ensuring that the technical structures are in place to implement the e-Hub, it is essential that the pilot project selects key personnel to undertake key roles so support implementation of the 3-year pilot project. Furthermore, the project will need to establish a set of robust procedures, which are designed to ensure a consistent implementation of the project across all participating schools.

The e-Teacher

The *e-Teacher* is key to the design and delivery of the virtual Leaving Certificate Physics course and associated learning experiences for students. The *e-Teacher* will be expected to teach a class grouping of up to 15 students, with the participating students coming from different post-primary schools in the Gaeltacht. The *e-Teacher* will be based in their own school and will be timetabled to teach the virtual class group. They will continue to teach face-to-face classes in their own school and will have release time to prepare and teach the virtual class group. The role of the *e-Teacher* is critical to the success of the pilot and ideally the teacher should:

- have an interest in online learning and its potential to expand learning opportunities for students
- be comfortable in the use of a range of digital tools to support learning
- be experienced in teaching their subject through the medium of Irish
- be comfortable with social constructivist teaching pedagogies that involve learners actively in developing their own understanding
- have a commitment to innovative pedagogical and assessment approaches, and
- have a commitment to lifelong learning and to developing their professional practice.

e-Teacher Competences

The project recognises that online learning is a new concept for many teachers and thus the following competences will be developed over time through ongoing professional-learning activities. However, in selecting teachers for the pilot it is important that they are open to developing new knowledge and skills in relation to online learning, and that they have a social constructive pedagogical orientation.

Having engaged in professional learning activities, the *e-Teacher* should:

- have a good understanding of what effective online instruction looks like and be able to create learning experiences to enable students to reach their full potential
- understand and be able to use a range of existing and emerging technologies that effectively support student learning and engagement in the online environment
- plan, design, and incorporate strategies to encourage active learning, application, interaction, participation and collaboration in the online environment
- promote student success through providing clear expectations, prompt responses and regular feedback
- model, guide, and encourage ethical and safe behaviour and an awareness of legal issues related to technology use
- recognise the diversity of student academic needs and incorporate accommodations into the online learning environment

- be able to create and implement appropriate assessments strategies online
- use data from assessments and other data sources to modify content and to guide student learning
- interact in a professional, effective manner with colleagues, parents, and other members of the community to support the provision of a successful learning experience for students.

e-Teacher Professional Learning and Support

Teaching online requires a new and different skill-set compared to teaching in a face-to-face classroom. *E-Teachers* will require a minimum of 30 hours of professional learning designed to prepare them for online teaching. To develop the competences listed above, the initial professional-learning activities should:

- use the virtual-learning environment to deliver content, communicate with students, promote collaboration and assess student progress
- promote innovative ways of presenting curriculum content, interacting with students, assessing student work, and communicating with parents
- use project-based learning to build authentic learning activities that engage students' interest and motivation
- develop strategies that will support at-risk learners who may feel vulnerable online, thus ensuring that students' wellbeing is being actively addressed
- develop approaches to support ongoing communication with the *e-Mentors,* teacher colleagues, guidance councillors and special-education teachers in the school(s).

Professional Learning Communities, as in the case of CWEA, can support teachers develop such competences through sharing practice, communicating challenges, brainstorming solutions and sharing lessons learned. Such professional conversations will help to build a successful team of *e-Teachers* and *e-Mentors* across the e-Hub schools.

e-Teacher Role

The online-learning classroom more naturally supports individualised learning than a face-to-face classroom setting. However, this creates its own challenges in terms of classroom management. The *e-Teacher's* role is one of a facilitator who guides and supports learning.

The *e-Teacher's* role is to:

- assess students' understanding of learning outcomes on an ongoing basis
- create and facilitate group discussions to facilitate deep learning
- develop and assess group projects
- make any necessary adjustments to course resources to meet the needs of students
- respond to students' questions and address any misunderstandings they have with the course content
- maintain ongoing communication with the *m-Teachers* and other support professionals in the students' school(s)
- set realistic expectations for each class group and follow through, as required
- set expectations with students and parents around the frequency of communication and e-mail response times.

The e-Mentor

The role of *e-Mentor* serves an important function in the partnership between schools, teachers and students. Its purpose is to provide onsite support for students to ensure they can flourish in the online environment. For students to be well supported and to ensure their success in an online environment, this position needs to be resourced.

The *e-Mentor* role may vary from school to school. This will depend upon the school's context, existing staff roles and the number of students participating in the virtual school.

Administrative Tasks

- Ensure that all students have internet access and school e-mail addresses
- Liaise with *e-Teacher(s)* to collect required school-report data
- Arrange supervision for any assessments that students may have to complete during the year.
- Oversee the distribution and return of any hard copy assessments, as required.

Communication

- Communicate with the *e-Teacher(s),* students and their parents, as required
- Communicate with other teachers in the school
- Encourage students to communicate with their *e-Teacher*
- Follow up on requests from the *e-Teacher*
- Notify the Hub school of any withdrawals
- Notify the Hub school of any ongoing or unresolved issues relating to student engagement, behaviour or communications from teachers and/or parents.

Student Support

- Ensure that students are comfortable with the processes established for accessing work, communicating issues and submitting work
- Engage with students to develop a rapport so they are comfortable seeking *e-Mentor* assistance as required
- Ensure students can access technical support as required
- Notify the *e-Teacher* about any concerns the school may have and deal with any concerns the *e-Teacher* may raise
- Where behavioural, child protection, wellbeing, or work issues arise, ensure that these are processed through the school's pastoral care, child protection and wellbeing policies, and ensure that there is follow through
- Provide guidance to students on how to become self-managing, independent learners
- Monitor and track student progress on a regular basis.

Student Recruitment

A positive online learning experience for students begins with the student recruitment process. Online learning is still relatively unknown to most students and parents. The recruitment process provides opportunities to help students and parents understand what is required to be successful.

Benefits to Students

The first step is making sure potential students are aware of the online courses on offer through their school. Potential students and their parents need to understand how an online course operate and what the benefits are. These include:

- The opportunity for students to access Leaving Certificate subjects not otherwise available locally
- Subjects taught by fully-qualified teachers in the chosen subject area with a high level of proficiency in oral and written Irish
- The opportunity for students to work in a safe, monitored online environment
- The online course will be fully integrated into the school timetable
- The course will offer shy or more reticent students the opportunity to participate in class discussions or chats with more ease than face-to-face class sessions.
- Students have access to ongoing support and professional advice on a one-to-one basis or in a small group context.
- Students will learn to use technology as an essential tool for learning.
- Online courses can be easier to concentrate as students are less likely to be distracted by other students and classroom activity.

Student Suitability

It is important that potential students understand what it means to be an online student. Many students falsely assume that online courses are easy and will require little effort. Students who enter with such perceptions are more likely to be dissatisfied and are less likely to be successful. It is necessary that students and their parents have a complete and accurate view of what it means to participate in the online course.

The first contact between a prospective online student and the online school is an important step in ensuring a successful transition to online learning. It is important to establish procedures to help guidance counsellors (and other online learning staff) mentor students through the process of enrolling and participating in online courses. These procedures should cover issues such as:

- An initial checklist of information points to cover with students and parents.
- A pre-enrolment survey to challenge students' pre-conceptions of online learning and to determine their level of readiness for this new learning modality.
- A student orientation course before the first academic course with Leaving Certificate students commences is required to set performance expectations, familiarise the students with the online system and identify any technical support issues.
- A review of online-learning policies to cover assessment and grading, homework, student behaviour and participation requirements, is essential.

Student Support

Student support extends beyond the online-learning environment and includes the support structures available in the school and external supports. These include recruitment support, guidance counselling and orientation supports as well as ongoing technical support, academic support, and mentoring.

Access to robust technical support removes one of the key barriers to student success in online learning while taking a significant burden off teachers. Tutorials and online orientation sessions familiarise students with the e-learning management systems to assist in a smoother transition to the online environment.

A face-to-face *e-Mentor* will help make sure that students stay on track. The *e-Mentor* will be a teacher or guidance counsellor at the local school. Communication between the *e-Teacher* and the *e-Mentor* is a critical aspect of the academic support provided to the student. In a situation where the student resists communication with the *e-Teacher,* the *e-Teacher* can communicate with the *e-Mentor* and then the *e-Mentor* can directly address the issue with the student, as appropriate.

Conclusion

This report has captured how a number of countries offer supplemental education to post-primary students in an online virtual environment, so they can extend the range of subject choices offered to students. In all cases, the respective education ministries have invested heavily in supporting teachers and students, so they can engage in quality teaching and learning experiences. Though the technology has improved over the past ten years, it continues to be essential that teachers, students and their parents are equipped with the knowledge, skills and dispositions to participate fully in online learning.

Teaching and learning experiences online are different to the learning experiences in a face-to-face classroom and all those impacted by this change of mindset and approach need to be supported. This will be an ongoing process that will require the engagement and commitment of teachers, school leadership, parents and students during the course of the pilot phase. The role of the teacher and the student will be different in this new model. There will be an onus on all involved to learn from each other and to adapt and develop the Gaeltacht e-Hub model over the course of the pilot. This is an exciting innovative project that has the potential to further expand the post-primary curriculum through the medium of Irish for students in small post-primary schools and Units (Aonaid) in Gaeltacht areas.

At the end of the three-year Gaeltacht e-Hub pilot, the Department of Education and Skills will be in a position to assess if such an approach has merit in the Irish educational system and, if necessary, to amend and refine the model further so that it can be extended across other curricular areas. The e-Hub pilot project has the potential to inform the Department's policy and practice in relation to student online learning across the system. It is anticipated that the findings of this report will greatly assist all involved in the design and implementation of a quality virtual-learning experience for students and teachers participating in the e-Hub pilot project in post-primary schools in the Gaeltacht.

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