

LOGGED-ON Case-study report - Summary

1.0 Introduction

The LOGGED-ON project partners work within a wide range of educational and economic contexts. These are detailed in their individual State of the Art (SoA) reports. They range from countries and regions with near full employment and ICT-rich learning environments to those with more limited classroom access to technology and more challenging socioeconomic conditions. However, what is much more striking is the similarity of practical educational challenges that teachers face in these varying circumstances. The LOGGED-ON SoA reports also identify that Web 2.0 based learning applications offer a great opportunity to promote learning and digital citizenship in all these educational contexts. This new technology is widely used by learners in the partner's organizations and these learners are able to utilize and capitalize upon any opportunities that their teachers create to promote their education. This is now possible without the huge capital expenditure that previous IT projects in education required. Mobile smart devices that Web 2.0 is built to serve are now owned by the vast majority of all of our partner's learners.

Just as the opportunity for exploiting Web 2.0 is shared across all partners, so is the main challenge in making it happen; the ability and willingness of teachers to harness its potential. Each partner describes its teachers as having very mixed ability and confidence when using Web 2.0 technology in a professional context. The SoA reports suggest that teachers who are innovating and already using Web 2.0 to promote learning are doing so because they have generated competence from personal use and then become professionally innovative in a self-starting way. LOGGED-ON seeks to explore and pilot how this good practice can be promoted to teachers more widely across our organisations, and which learning technologies are pedagogically effective and which are not.

The case-studies undertaken by the LOGGED-ON partners were initiated to try and counteract this apprehension amongst teachers and to identify and trial the use of new technologies in the classroom enabling non-ICT specialist teachers to experience the positive effects of technology on their students' learning outcomes.

As LOGGED-ON is based around active 'case-studies' which will explore effective pedagogy, it is relevant to comment on the preparedness of our partners for this activity as described in their individual State of Art reports:

- Ireland:
Ennis Community College been in the forefront of technological advancement for many years and "College management has supported this through policy formation and, in as much as was possible, through financial investment" (SoA Ireland). Several examples are given perhaps most notably that the School has pro-actively embraced the concept of 'flipped learning' an idea that encourages students to

watch demonstrations and presentations online prior to their class and then be supported within class to hone and consolidate their skills and knowledge supported by the teacher. The 'Flip' is that what used to be in class becomes 'homework' and what was 'homework' becomes the content of the class. Ennis Community College have set up a 'Core team' with relevant equipment and software to generate their own video content to support this.

- **Spain:**
Institut Cal·lípols has well developed virtual learning environments (VLE) and large proportion of groups use social media as an effective form of educational communication: "Most groups organize their own chat services in WhatsApp or Facebook" (SoA Spain). Their SoA report also notes that most of this has grown organically by encouraging motivated teachers and disseminating best practice.
- **England:**
Kendal College has provided a well-developed VLE for its learners. Some departments go beyond this as students blog their coursework and tutors feedback on these blog posts. This allows some departments, particularly in the Creative Arts subjects, to expect students to "blog their responses to course work" (SoA England). In these subjects, the media rich environment allows students to comment on prompts given by tutors or annotate their own creative projects.
- **Italy:**
Scuola Ladina di Fassa has "its own YouTube channel called 'Spazioarte' where students upload the videos they shoot and edit, such as interviews, promos, clips from TV reports, documentation of didactic practices, projects and activities, participation in events, virtual tours, exchange experiences" (SoA Italy). This helps engage students, parents and the wider community in a modern, media rich way that actively supports the minority language of Ladin and its wider stakeholders in an innovative way.
- **Norway:**
Haugaland videregående skole has a proven track record of using IT in a learning environment. It has invested in teacher training to use the IT resources at its disposal. As a result of a national initiative all students and teachers have their own personal laptop to be used in school. "Ready access to high speed internet also affords the students the possibility of using Web 2.0 tools in their learning" (SoA Norway).

It is evident that whilst none of the partners claim comprehensive expertise in the effective pedagogical use of IT, they each have professional cultures where experimentation is inspired, supported or encouraged by the senior management in each institution. Therefore, each partner was well suited to the adoption of the case studies that they identified as being of particular interest to them during the LOGGED-ON project.

2.0 Context

As outlined in their SoA report, Italy is undergoing profound changes in its school system thanks to new laws and government initiatives which offer them an excellent opportunity to embrace innovation and new technology. This is also the case in Ireland where the focus on emerging technologies is being constantly incorporated into the curriculum. Despite these changes, it is evident from discussions between the LOGGED-ON partners that as teachers and administrators we tend to lack our students' technological ability, in social media platforms for example, and their ability to transfer this digital knowledge to classroom-based learning.

By identifying teams of forward looking teachers in each institution who (while being non-ICT specialists themselves) were happy to work on a bottom up approach of learning from students and each other and working together in peer support groups, the LOGGED-ON project set out to identify technological tools that are suitable in the classroom environment. These teachers were not intimidated by the notion of having to consult with their students, who could be considered “digital natives”, in order to develop effective communication and cooperation channels.

Three of the LOGGED-ON partners (Italy, Ireland and Spain) realised at an early stage in the project that their institutions had limitations regarding access to modern ICT equipment and knew that they would have to invest in infrastructure and/or technology or consider placing more reliance on their own personal devices (or those of their students). This need for a robust infrastructure was one of the deciding factors when the Spanish partners was choosing their case studies and deciding to have “Adequate school Wi-Fi connectivity” as one of them. The Italian partner has also seen the need for more reliable internet access and has used what they have learnt from the project in refining equipment specifications for the new school buildings currently under construction for completion in September 2019.

For the two other LOGGED-ON partners (Norway and England) their access to a stable and fast internet connection and excellent student/device ratio meant that they could look at other aspects of technology in the classroom and work directly on its pedagogical exploitation.

Despite the differences and challenges regarding internet access all partners were eager to use the technology which they had available and to work with their students on enhancing their learning. The importance of the LOGGED-ON partners’ diversity was seen as a strength for the project as this diversity was representative of many schools and institutions across Europe. The key issue of exploring “what works, where and why” was important for the partners in all situations.

The case-studies that were chosen by the LOGGED-ON partners indicate what they considered important at the beginning of the project. However, as the project progressed, the case studies were updated as new technologies became available. For instance, the use of immersive virtual reality at Institut Cal-lipolis is a recent addition as the technology became more readily available during the project’s lifetime and operating costs were significantly reduced.

Some of the case-studies were similar across the LOGGED-ON partners (for example Plickers and QR-codes). This was a deliberate decision to identify the usefulness of the tool in the various institutions irrespective of the different contexts regarding ICT and infrastructure. While Norway, Ireland and Spain focused on QR-codes, Ireland, England and Italy looked at Plickers as a tool enabling assessment for learning (AfL).

The case-studies the LOGGED-ON partners worked on over the course of the project are the following:

Norway:

Digital textbooks

Flipped Classroom - low tech

Dynamic ways of tuition using Web.2.0

QR-codes in the workshop

Lecture capture in the classroom

Ireland:

Flipped Classroom - high tech studio
Plickers – assessing all students
Creative use of QR-codes

England:

Twitter in the classroom
Quiz APPS – Plickers, Kahoot, Socrative
Anatomy Apps

Spain:

Adequate school Wi-fi connectivity
Google mail and Google Classroom apps for students
Institutional YouTube channel (for video tutorials)
Geolocations
QR-codes - used to access materials in classrooms
Using 3D technology with students (immersive virtual reality)

Italy:

Plickers as an evaluating tool
Wordpress.com as a platform for sharing
Video tutorials as outputs for learning, applying and sharing

3.0 Aims and methods of the case-studies

As stated on the project’s website the “EU funded project aims to enhance the capacity of non-ICT specialist teachers to provide interactive, student-centred teaching and learning using technology by identifying and providing the training and support they need to engage and develop students’ pre-existing digital skills in support of their personal and social growth, their vocational education, and their lifelong employability”.

This was also reflected in the aims of the individual case-studies listed above. Each partner team has been responsible for setting up their specific aims and how they would achieve them. However, there were some common guidelines which the LOGGED-ON partners agreed to apply at for each institution.

- the discovery and experimentation of new technologies with an educational context
- to have a particular emphasis on mobile phones, tablets and personal computers
- to have some form of training for their staff in the new technology
- to create confidence and enthusiasm within the teaching staff on the use of ICT
- to encourage students to become self-directed and independent learners
- to assist and benefit students’ learning outside of the classroom

The aims of the various case-studies were evaluated by the partner teams using a combination of questionnaires, classroom observations and interviews with the students and other staff involved. Their principal findings and conclusions are summarised later in this report.

4.0 Implementation in the partner institutions

Throughout the project emphasis was placed on exploring “what works, where and why” regarding the empowering of learning through technology. The project’s main focus has been to discover and actively use a variety of tools in the classroom to do this. Within an action research paradigm, non-ICT specialist teachers have worked together with their colleagues and students to identify ways in which technology can enhance student learning.

After identifying and agreeing the focus of the partners’ various case-studies, the respective LOGGED-ON teams met to discuss in more detail how their case-studies would be implemented in their own schools. Who would be the focus groups? Whether there would be any control groups, and what would be the timeframe for the various case-studies within a range from a few weeks to a whole school year. Evaluation of the case-studies were also discussed. The case-studies were not intended to be rigorously “scientifically” evaluate. However as in all action research, demonstrable enhancement of learning was expected to take place.

Many of the LOGGED-ON partners chose to implement their case-studies with classes of students. In some cases, however, the partner’s entire institution was involved as in the case of the Spanish partner when they were upgrading and improving the wi-fi accessibility and implementing of Google mail accounts for the whole student body. The Norwegian partner also involved other stakeholders outside of the school when testing the use of Web 2.0 to collaborate with other institutions.

Staff other than those most directly involved with the project have also been involved either through trialling new technology or attending training courses held by the LOGGED-ON teams at the various institutions. This has enabled the case-studies to be disseminated throughout the partner institutions and given a good indication of the success of the various tools. The Spanish and Irish teams in particular have held regular workshops for their staff, bringing them up to speed with the technology that was being tested (Google classroom and Flipped classroom). The Norwegian partner has also held a number training courses for their staff encouraging them to try out some of the new web 2.0 tools and low-tech versions of the “flipped classroom”. These courses will also continue after the project has finished.

5.0 Findings

In the section below the case-study findings have been summarised. Because more than one institution has worked on the use of QR-codes and Plickers in the classroom this report will focus particularly though not exclusively on these two applications. However, the findings from other case-studies can be found in brief here or more fully detailed on the LOGGED-ON website (www.loggedon.eu).

QR-codes

A QR-code is in effect a barcode that can be scanned using the camera of a smartphone. The creation of a QR-code is generally free and very simple. In Ireland, Ennis Community College uses them to open URL’s with links to videos, quizzes, demonstrations etc. QR-codes have also been used as an AFL (assessment for learning) tool where students can self-assess their own work and in effect become self-directed and independent learners who are capable of taking responsibility for their own discovery learning. By scanning a QR-code related to a particular exercise the student is struggling with, they can check the correct solution against their own. The QR-code can either show a short video showing how to solve the problem or a document with the answer. In addition, QR-codes were placed around the school to assist not only with learning within the classroom but also

with students own personal development. QR-code posters were made to assist with student literacy and numeracy skills and QR-codes posters were also made to highlight and raise awareness on issues such as Bullying, Cyber Bullying, Racism, Healthy eating and to assist with students' study skills.

Haugaland vgs, the Norwegian partner, has encouraged its Automotive students to record their own instructional videos about car repair, upload them on YouTube and create QR-codes with links to the videos. These codes will then be used by next year's students to access tutorials that their peers have made. In Tarragona the Spanish partner used QR-codes in the botanical department identifying trees and shrubs around the campus where both students and other visitors can access more detailed information and literature about the natural environment.

Findings:

These three institutions found themselves in agreement about the varied usefulness of QR-codes in allowing the students to become self-directed and independent learners who were able to learn for themselves by scanning a QR-code which brought them to a video, worksheet or website. In addition, they found that students were very eager to engage with discovery learning through utilizing their own mobile devices. In essence, students were happy to be learning in an innovative manner that was different from the normal "chalk and talk" which is prevalent in many classrooms around the world.

Furthermore, they discovered that the use of QR-codes in conjunction with popular websites (such as the Khan Academy website) and other websites similar to this, helped to cater for the wide range of abilities and needs within the modern-day classroom and in effect helped to differentiate work for the different types of learners in the classroom. In addition, they found that QR-codes were particularly useful for weaker students as they had the ability to watch the whole video and their learning improved significantly as a result. The use of QR-codes to differentiate in this manner ensures students can learn at their own pace and reduces the risk of a student falling behind.

By placing the QR-codes around the different institutions, awareness on everyday issues was raised. This worked very well as students were able to scan these codes at break or lunch time to learn about issues such as mental health, healthy eating, study skills and other issues.

One of the schools discovered that QR-codes were particularly beneficial in the promotion/PR of the school. In particular, placing QR-codes in local newspapers allowed them to advertise the school in an inexpensive and innovative manner. For example, advertising school open days/nights and other events running in the school. People reading the newspaper could scan the QR-code and this would link them to the school website to give them additional information on various events. In addition, QR-codes allowed the school to showcase student success in extra-curricular and academic activities. Feedback from parents on this was quite positive as the QR-codes placed in the local newspapers and leaflets allowed parents to learn more about what was happening in the school.

Regarding the training of staff, the partner schools learned that by providing a demonstration/workshop on QR-codes at a staff meeting and encouraging teachers to download the QR-code scanner worked well. Teachers who initially thought that the use of QR-codes was difficult and time consuming could see how easy it was to create a QR-code and how quickly students can scan these to bring them directly to a link. In particular, the

teachers were interested and engaged when they could see how students could scan the QR-codes and watch the videos at home.

Both students and staff found the use of QR-codes to be particularly beneficial and responded well to the use of them in the questionnaire given. In general, teachers saw QR-codes as “helpful,” and “easy to use,” and they particularly liked “how simple links could be provided to websites to such as Khan Academy and YouTube to supplement students learning.” In addition, it was clear that students also fully embraced the use of QR-codes within the partner schools. A survey carried out by a number of students at Ennis Community College (Ireland) also provided positive feedback on the use of QR-codes as students explained how they were able to “learn for themselves,” be “able to watch videos and not have to ask the teacher for help,” and were “motivated to learn because they got to use their mobile phone.”

Plickers

All schools across Europe are required to use both formal and informal methods in student assessment. This usually involves some form of grade or written feedback being given to the student. Assessment for Learning (AFL) is essential in making the learners’ knowledge (or gaps in knowledge) visible for the teacher, allowing them to differentiate their teaching strategies and provide constructive feedback, which was ranked as highly significant in making improvements to learner outcomes (Hattie 2011). While formative assessment strategies are essential for ensuring learners are engaging, taking part in lessons, and meeting the required learning outcomes of the session, it can often be difficult to track progress when relying on strategies such as questioning and discussion in the classroom.

Since 2016 Kendal College (UK) have been trialing various apps for use in AFL and tracking the progress of their learners. As a result of the importance placed on AFL strategies, they have realized it is essential to implement effective approaches which are visible to staff, learners and management in order to track and monitor progress. There are now several apps available that make it possible to track the results of AFL and provide quantitative data clearly showing learner progress. These apps can be used in the classroom, providing clarity of learning outcomes and generating data from which the teacher can adapt their practice to suit the needs of the learner.

Plickers is a powerfully simple Web 2.0 tool that lets teachers collect real-time formative assessment data without the need for student devices. Plickers can be used for quick checks for understanding whether students are understanding big concepts and mastering key skills while enabling all students the chance to participate and engage in learning without feeling self-conscious. By using Plickers there is more focus on teaching and less on set-up and there is no waiting for students to log-in to a computer or open the right app.

Plickers does not require the learners to use their own device. Instead, they are allocated individual QR-codes, which are printed on cards. Each card has the letters A-D written along each edge of the code, so they can be turned to show the different letters at the top of the card. Teachers use their own smartphones/tablets and computers to show the multiple-choice questions on the screen at the front of the class. Students then turn their card so that the letter that corresponds to the answer they think is correct is at the top. The teacher then scans the QR-codes using the app on their phone/tablet to determine which student has answered correctly.

Ennis Community College (Ireland) realized that if they could use ICT to focus more on student assessment in the everyday lesson, it would provide the teacher with an effective way to measure student progress on a daily basis. A challenge that presents itself in the classroom daily is that it is often the same students who answer all

the questions.

It is virtually impossible for teachers to question all students every day. However, through the use of Plickers every student has the opportunity to answer and the teacher can view each answer in moments. For example:

1. **Start of class:** - 3 question quiz. A quick way to assess background knowledge.
2. **During class:** - to gauge if students are on track with the lesson and to reinforce knowledge & recap the learning.
3. **End of class:** - Plickers can be used as a self-assessment tool. Plickers can be used as an exit ticket. Ask a question and quickly gauge if students understood the lesson.

Scuola Ladina di fassa (Italy) introduced Plickers to their school after seeing the tool used at Kendal College (UK). Within the teaching of artistic subjects in the institution, their students need to demonstrate a good understanding of the inherent themes of the art subjects and different techniques. They also need a thorough understanding of the materials used and the ability to put into practice the acquired skills and understanding needed. In addition, they need to master time management, self-criticism of the work produced and judgement of others' work. When exposed to Plickers the Italian team saw that the tool was a new method of evaluation that could be used in their artistic classes because it was immediate and anonymous in contrast to the classic (paper-based) method used previously. By using Plickers the teachers gained an immediate result, giving them an opportunity for teacher-student sharing, much more quickly than the traditional method.

Findings:

While there are more initial steps to set up Plickers than for other apps tested, once the group set-up is complete, the question writing and allocating process is largely the same. Initially, each group is set up as a Class on Plickers and each student is allocated a number that corresponds to the card they will be given. They then use this same card in every session that Plickers is used, enabling the teacher to compare their previous results. Once this has been done, it is very simple to create questions and add them to the queue for that particular group.

As Plickers does not require students to have their own device, classroom use is very simple. This means that Plickers quizzes are very quick and easily done for all learners, making them inclusive for those with disabilities. They also avoid learners having any technical difficulties when using their own devices. The only device that can potentially experience technical difficulties is the one being used by the teacher, significantly reducing the likelihood of such an issue occurring. Plickers caters for visual and kinaesthetic learners in the classroom and all students are assessed instantly, which is more effective than the traditional hand raising form of questioning.

Plickers provides both a detailed history of each question (allowing questions to be re-used to track progression) and generates month by month reports for each class. These reports can be viewed in-browser or exported as CSV files. These reports show students' overall percentages for the month as well as percentages for each question and a breakdown of which questions were answered correctly for each student. Teachers at Ennis Community College (Ireland) found this very useful as it allowed the teacher to self-assess by becoming aware of the topics that need to be revised.

PDFs can also be generated for each student to give their percentage for the month as well as the class average and a list of the three most commonly missed questions. This meant that the student themselves could put their results into perspective by seeing the class average as well as their own score. This enabled them to see their

strengths and weaknesses on various different topics. If these reports were produced on a monthly basis, progress could be tracked by both the teacher and the student. The transparency of such data also allows it to be logged on a college system (e.g. LMS) as a tool for monitoring progress across all subjects when it is implemented by all staff.

While the question type is restricted to multiple choice and true/false questions, it is still possible to generate qualitative data to a degree. In subjects such as Music, it was used to provide learners with the opportunity to critique each other's compositions anonymously. Due to the closed nature of the questions, using it for this purpose is limited in the feedback that learners can receive but it is useful to provide quick data on how their work is received by to their peers and others.

Students were very receptive to Plickers. They enjoyed the competitive element and, by not knowing what everyone else had said as they would have done in a simple hand-raising exercise, they did not feel embarrassed or unsure about answering differently from their peers. Students could tell each other if they had answered correctly if they wanted to but this information was not available to the whole class, making it more inclusive of both shy and outgoing students. Students also liked how easy it was to use and that it didn't take long to set up before they started the quiz.

Some of the schools with inadequate wi-fi had a number of issues around the use of internet data. Teachers in these schools expressed concern about using the app and using their own data to facilitate it. However, the teachers found Plickers to be an incredibly positive and useful tool in the classroom for questioning students as well as getting them to take responsibility for their own learning. Plickers is now increasingly used in staff meetings as to vote on particular issues as they arise. This is a particularly easy and effective way to continue to use the App and continually introduce it to staff. The schools found that staff were more inclined to use the App if they had practiced themselves in staff meetings.

Finally, on a specifically practical level, it was found that matt laminate works best when covering the QR-codes. Normal laminate caused a glossy reflection and the QR-codes could not be read properly by the mobile device.

Flipped Classroom

Both the Norwegian and Irish partners had experience of working with flipped classrooms prior to the LOGGED-ON project but neither had enjoyed too much success in spreading the method to other teachers in their institution. Many teachers agreed that the Flipped Classroom method is effective and had much going for it in the modern school environment. Unfortunately, many educators have ambitious plans for using the method in their teaching, but these plans often dissipate after a short time. It seemed that this might be attributed to the lack of technical ability or an unfavourable cost-benefit ratio in relation to and how much effort one has to put into planning and preparation in relation to the educational gains.

Teachers can today find programs and videos which others have made (e.g. Khan Academy etc.), but both partners agreed that the basic idea in reversing teaching thus, is that it will be most relevant and personal when the lesson is produced by the students' own day-to-day teachers.

It was therefore decided to try two approaches. While Ennis Community College would produce videos similar to Khan Academy and purchase equipment and software for their school to make similar quality videos – high-tech, Haugaland Upper Secondary school would work on reducing the technical barrier teachers had to breach to

make instructional videos by using equipment readily available to teachers (smartphone, pen and paper and a YouTube account) – low-tech.

Findings:

- Student's benefit from reverse teaching seems not to be affected by the video's aesthetic and technical design.
- Teachers with a high degree of technical expertise and enthusiasm are far more likely to make use of the method.
- Despite completing training in reverse lessons using more advanced technical solutions most teachers do not continue with the method.
- Training in low-tech flipped classroom significantly increases the likelihood for implementing reverse lessons in the classroom.
- Using simple tools that most teachers already are familiar with requires small investments in technical equipment, software and training.
- For reverse teaching to spread as a method throughout a teaching body, each individual teacher must discover for themselves that the educational benefits are proportionate to the required time and effort to produce teaching materials.
- Even low-tech flipped classroom has little or no value in classes without motivational methods.

Digital textbooks

Haugaland Upper Secondary school (Norway) has over a number of years provided textbooks for its students free of charge. This is a national policy regarding the right to free education. The students also receive a grant enabling them to purchase their personal laptop to be used in school. Recently a number of publishing houses have produced their textbooks in a digital version. However, this would require an additional investment from the school. This particular case-study aimed was to enquire into whether this investment could be warranted.

In the case-study, digital textbooks were used in three subjects. These digital versions were produced by the same publishing house and were similar in design and features. One could question the likelihood of whether or not another digital textbook from another publishing house would get different results. Nevertheless, we can say that the digital textbook our survey is based upon, was a well-functioning textbook with modern tools (e.g. audiobook and "off line function") that the students' were interested in. Thus, we must conclude that our results are adequate and representative for this peer group.

Findings:

- the overall use of the textbook declined with the introduction of digital textbooks.
- the number of tasks from the textbook being completed also declined.
- the students found the digital version more "unavailable" and they therefore used it less.
- the use of the textbook outside of school hours (on the bus, at home) also decreased considerably.
- the various tools incorporated in the digital textbook (audiobook and memo function) were not utilized by the students.

It is difficult to conclude whether the learning outcomes of the students increased (or decreased) with the introduction of the digital textbook. To answer that question a much larger and more thorough investigation is

needed. It is nevertheless conceivable that when the amount of time spent on learning materials goes down, also the learning outcomes must be reduced.

The overall conclusion from the case-study is that students do not have a huge benefit from having access to a digital textbook (as initially anticipated). The use of the textbook did not increase (in fact the use was reduced), and the students' benefits of having a digital textbook were not apparent. Considering that digital versions of textbooks often inflict upon schools an extra cost, the investment is not recommended.

Lecture capture in the classroom

During the course of the LOGGED-ON project Haugaland Upper Secondary school (Norway) had a student who was too ill to come to school and yet had the right to an education. The school was interested in finding a way for this student to participate in the "classroom experience" while being at home. Flipped classroom was one option, but this only brings the teacher's voice home to the student. The team wanted to bring the whole class home to the student and let them feel part of the collective.

The student's illness prevented them from following the teaching in "real-time" and therefore an asynchronous method had to be considered. The method had to be simple in its execution so that the "device" did not disturb the class or the teaching/learning.

The device chosen is an iPad connected to a "Swivl". The Swivl device is a smart camera-mount that moves/follows the teacher as they move about the classroom. The teacher wears a lanyard and tracking device (marker) that acts also as microphone and remote control. The iPad is connected directly to the Swivl either via Bluetooth or a cable. This ensures the sound is transferred clearly and continuously. Film footage is stored directly in a dedicated app on the iPad and can be uploaded to the Swivl cloud to be shared with students and other teachers as desired (password protected).

Findings:

The following conclusions were made after interviewing the student and the teachers involved in using the equipment.

- the video recordings were of acceptable quality when the teacher used a PowerPoint presentation, however it was often difficult to read what the teacher had written on the whiteboard.
- the recordings were best when the equipment was placed in the centre of the classroom although this could become obtrusive for the class.
- the teacher's voice was very clear because of the lanyard marker the teacher wore, however the student found it difficult to hear most of what was being said in the classroom (particularly classroom discussions).
- the teachers responded positively to the ease of setting up and operating the equipment (after a period of trial and error). The ability to upload the recordings to the Internet was also very simple and effective.

In conclusion, the school will continue trying out the Swivl device and make the necessary changes to provide better sound/recordings of the class students discussions. While this is easily possible with the purchase of more markers/microphones (max 5) that can be placed around the classroom, the "ethical" dilemma still needs to be addressed. The students must give their consent for their discussions to be recorded and "made public". We are still deciding the best approach for this.

Dynamic use of Web 2.0 tools

Web 2.0, also called Participative (or Participatory) and Social Web, refers to World Wide Web websites that emphasize user-generated content, usability (ease of use, even by non-experts), and interoperability (this means that a website can work well with other products, systems, and devices) for end users. A Web 2.0 website often allows users to interact and collaborate with each other in a social media dialogue as creators of user-generated content in a virtual community.

At Haugaland Upper Secondary school (Norway) various Web 2.0 tools have been used in the classroom by several teachers, however this was largely due to their own interest. One teacher in particular has worked extensively with such tools and wanted to investigate further the benefits of using Web 2.0 with her students. A number of other teachers and stakeholders were involved in the case-study. While not exhaustive the tools explored have been categorised under the four cognitive processes based on how people learn: Attention, Encoding, Storage and Retrieval. This chart can be found in the case study report on the LOGGED-ON website.

Findings:

- the main idea behind using Web 2.0 tools is not to benefit of the teacher but to enhance the learning of the student.
- it is not the tool itself but the learning process it generates which is the main focus.
- by using Web 2.0 tools the students can more easily collaborate with each other and be productive.
- digital natives are more flexible at utilizing the digital tools. Even older students are more reluctant to use some applications.
- when there is no Internet access, poor internet connections, no or outdated laptop provision, the technology-based lesson may easily become a flop.
- applying more than two Web 2.0 tools in a lesson tends to be too confusing for some students.
- it is far from uncommon for some students to attempt to sabotage the real-time activities. After three or four times and a serious talk about netiquette combined with peer group pressure, this is usually no longer a problem.
- diverse digital tools should be applied with caution as each new tool requires a fair amount deal of mental adjustment to the new learning style.
- Teachers' determination to pursue academic success and their expertise in utilizing the tools are essential.
- the majority of digital tools are creative and dynamic aids that promote the learning process. However, outcomes differ – varying with the maturity, interest, mood, and expertise of students.

6.0 Conclusions

The LOGGED-ON case studies aimed to identify, demonstrate, and analyse best practice and support in Web 2.0 usage within the partners' own institutions and local communities of practice. They were undertaken to try to shed some light on the project's key questions of "what works, where, and why". As noted in the Introduction to this overview, the case-studies as a whole indicate not just the striking similarity of practical challenges that our teachers faced within their different socio-economic circumstances and levels of ICT provision, but also what appear to be some of the most successful ways of meeting them.

Thus, all the case studies show QR-codes to have enormous potential for managing and facilitating more independent, self-directed, and student-centred learning through a form of discovery learning in which students used their mobile devices to access more detailed web-based information on specific topics where and when it best fitted their own needs and circumstances. Students with different abilities, needs and predispositions were able to learn at their own pace. This was particularly helpful for students who might otherwise have tended to fall behind. A perhaps unintended consequence was the easier and more economical diffusion of general school and educational information to students and parents through the use of QR-codes in institutional displays, notice boards, local newspapers, etc. Most students in the case-study schools reported positively that they found QR-codes helpful and easy to use. Moreover, the general resistance or scepticism to Web 2.0 tools of many non-specialist ICT teachers tended to be reduced significantly through demonstrations and workshops showing how easily they could use QR-codes themselves and how tangible were the benefits to themselves and their students in terms of more efficient and effective teaching and learning.

The effectiveness of QR-codes depends, however, upon all students having their own mobile devices. They were correspondingly more effective when the home or the school provided students with such devices. In the case studies, it was rare to find students of secondary school age without their own mobile phone and this is supported by statistical data, but this possible limitation must be acknowledged. There was also significant national and regional variation in Internet connectivity and accessibility within the case-study schools. This could also be a problem with the use of Plickers, though to a much lesser extent, as indicated by the schools which focussed their case-studies upon this technique. However, Plickers has the considerable advantage of not requiring students to have their own mobile devices. Much more extensive, systematic and rigorous evidence would be needed, however, to support a claim that the use of Plickers is simply more effective and efficient than QR-codes. Each has its advantages and disadvantages as indicated by the case studies. However, Plickers' non-reliance upon students using their own devices in the classroom and the related avoidance of ensuring connectivity for each individual device gives it considerable advantages.

These advantages were particularly clear from those case studies which engaged students and their teachers with Plickers in the context of Assessment for Learning. AfL is now almost universally regarded, in one form or another, as an essential pedagogical paradigm. Using Plickers allowed teachers to collect, monitor, and evaluate real time data on the learning progress of each individual student in their current classroom, adopt their day to day practice accordingly, and monitor individual student progression over longer and more frequent periods of time. Because there was no need for students to have their own mobile devices and no time was wasted through issues of class or individual student connectivity, Plickers proved to be a highly inclusive use of Web 2.0. It was particularly suitable for countries, regions, and institutions where more elaborate internet connections were problematic. At the same time the case studies indicated a possible downside for teachers, especially those less confident with ICT and more disposed to scepticism, in the amount of time needed for initial group set up. In

general, however, this issue became less critical as teachers became increasingly aware of the longer-term gains in efficiency and effectiveness once this initial set up was done. Overall, response from students and teachers was very positive, as indicated by the fact that one of the partner institutions which specialised in creative arts and design adopted Plickers for its own curriculum after seeing it in use by another partner.

In their case studies of flipped classrooms, 2 partners were able to conclude: firstly, that although it was possible to “import” many excellent materials, this approach worked best when videos, etc. were prepared by the students’ own teachers; and secondly, that similar results ensued whether they sought to emulate high quality products or go for lower-tech materials that could be more easily produced and diffused by wider circles of teachers. In both cases, benefits to students’ learning did not seem to be particularly effected by more sophisticated design of flipped classroom materials, and the more advanced the technical solutions were, the less likely they were to generate and sustain their appeal to all but the more specialised and committed teachers. As always, however, motivating students was still the key to success, and virtually all classroom uses of Web 2.0 which drew upon the students’ experience and interests as “digital natives” were likely to enhance their motivation as active participants in learning through their relative expertise in the use of mobile devices. By way of contrast, the case study of digital textbooks seemed to fall within a rather different category. It led to the conclusion that the net benefits of students’ being provided with a digital text book in three school subjects did not seem substantial or clear enough to warrant the necessary investment.

The project co-ordinators, at Haugaland Vocational Secondary school, were able to draw upon a sustained period of involvement with the dynamic use of Web 2.0, as well as their partner’s case studies, to formulate the set of overall findings outlined in the preceding section of this review. In general, all the techniques and methods looked at in the case studies demonstrated very clearly their potential for much wider application, institutionally, regionally, and nationally. All the partners used their exposure to case-study work in the other partner institutions to improve and adapt the Web 2.0 tools they were already using, and to introduce those with which they were less familiar. It was equally clear, in all the case study institutions, that the key participants in the project were generally teachers who were already specialist and/or committed and enthusiastic classroom exponents and champions of ICT. The key issue for ensuring wider exploitation of Web 2.0 was for them to generate adequate if not equal enthusiasm amongst their less committed colleagues. The partners found an overwhelmingly positive response from their students to the case study innovations but, initially at least, their colleagues’ responses ranged through indifference, scepticism and downright hostility. Technical issues of internet provision aside, this was undoubtedly the major challenge encountered within the partner institutions to the wider exploitation of Web 2.0.

As indicated above, the technical issues and challenges can be addressed to a very significant extent by tailoring modes of provision to existing patterns and systems of internet connectivity, for example, more or less use of Plickers and QR codes as appropriate to existing systems. The case studies provide examples of how this might be done, and this is part of the answer to “What works, where, and why?” However, it was also clear from the case studies that demonstrations to school leaders and other teachers of the pedagogical efficiencies and effectiveness of Web 2.0 seem to be the key mechanisms through which to meet the wider, non-technical challenges facing wider exploitation of Web 2.0. Much of the scepticism and resistance from colleagues, most of whom were not “digital natives” in the same way as their students, was founded upon their lack of familiarity and self-confidence with “new technology” in general. Within the partner institutions, increased exploitation of Web 2.0 by wider circles of teachers not centrally or directly involved with the project was certainly associated with the increased opportunities and resources which it provided for ICT specialists and enthusiasts to

demonstrate “What works, where, and why?” to their colleagues. Perhaps the single most important conclusion to be drawn from the case studies is that such opportunities and interventions are vital if these key individuals are to act as “change agents” to facilitate their institutions’ wider exploitation of the very considerable and demonstrable pedagogical potential of Web 2.0 in the classroom