







## 9.2. BYOD maximising benefits from national infrastructure investment in Estonia

This case study looks at how five Estonian schools are building on past infrastructure investment and seeing BYOD as an efficient way of managing resources.

	Primary, secondary, upper secondary		Urban and rural
	Mobile phones, tablets, laptops		Mixed catchment

### Background and context

Estonia has been described as “one of the most digitally visionary and internet-dependent countries” ([Harrison, 2014](#)). All Estonian schools have had fast broadband since the late 1990s and there are national strategies for ICT for learning research, e-learning/digital media literacy and teacher training. The [2013 ‘Survey of schools: ICT in education’](#), conducted for the European Commission by European Schoolnet, found Estonian schools students’ use of their own laptops or mobile devices in school is above the EU average. These five very different Estonian schools have shared information about the BYOD experiences of around 1,600 students and their teachers and the impact that BYOD is having.

- **Gustav Adolf** gymnasium (GAG) is a primary, secondary and gymnasium school of over 1,000 students in the capital city Tallinn. The school achieves excellent learning outcomes and students are partially selected on the basis of academic achievement.
- **Oskar Lutsu Palamuse** gymnasium and **Luua** elementary school are both located in Palamuse, a rural municipality in the East of Estonia.
- **Tartu Tamme** gymnasium is a large urban school in the City of Tartu specialising in science subjects and attracting students from across Estonia but especially from the South of the country. The school has been operating some BYOD since 2013.
- **Pelgulinna** gymnasium is a primary, secondary and gymnasium school in a lower middle/middle class area of Tallinn. It is not ranked very high in the academic ranking system but is growing fast, possibly due to a reputation for innovation and preparing students for life not just for university. The school has been testing and implementing BYOD since 2011.

### BYOD drivers and aims

All the schools report similar drivers and aims. BYOD is seen as an example of efficient management of resources. The schools would like to make more use of technology but existing computer classrooms are insufficient and the schools lack funds to buy mobile devices for all students. Also, any devices purchased need replacing every two or three years. However, most students already own at least one device and, therefore, making educational use of these is seen as sensible. Also, the students are already in the habit of using their smart devices which is helpful. Other drivers for BYOD included wishing to:

- make lessons more interesting
- add variety to teaching
- implement active learning methods
- more efficiently achieve learning objectives
- improve participation
- improve access to information
- improve teachers’ ICT skills

Four years ago Pelgulinna’s ICT Development Manager wished to introduce mobile learning and approached a mobile network provider for support. The company was encouraging but only gave the school six smartphones. However, these enabled her and her students to start learning how to use the devices for teaching and learning and this positive experience informed the BYOD decision.

### The mobile devices

Students in all the schools own smartphones, tablets and/or laptops and the smartphones and tablets are the most typical BYOD devices. The schools also own a small number of devices which can be lent to students as necessary.





### Advice, training and support for teachers

At GAG each year training courses for teachers have focussed on using mobile devices, apps and learning environments for teaching and learning. Future plans include more courses and creating lesson plans and guidance for teachers. At Tartu Tamme some general ICT courses have been provided and teachers have been directed to participate in webinars, exhibitions and workshops. Also, more experienced colleagues are encouraged to support their peers in using ICT.

Teachers at Palamuse attend a training course on using iPads for teaching. Then the school educational technologist works with them individually on how to carry out basic tasks including creating Showbie accounts for their students, connecting to Wi-Fi, installing apps, using the camera and finding files. She then helps them to prepare, deliver and review the “smart” part of a lesson.

Pelgulinna provides professional development for teachers in the pedagogical use of mobile devices and online safety as well as training them to use tablets and search for apps.

Four years ago, using the smartphones donated by a mobile network provider, the ICT development manager worked with her students to develop mobile learning materials. These students then trained the teachers who were enthusiastic. ICT students continue to share ideas with teachers and help develop websites including lesson plans. Teachers then share with peers ideas about what to do in lessons and how to use mobile devices and apps.

### Funding arrangements

In all schools parents, or the students themselves, pay for the mobile devices and the school pays for Wi-Fi. School broadband connections are provided by the government.

### Participation in BYOD

About 500 GAG students at the secondary and gymnasium levels bring their own devices. GAG does not operate BYOD at primary level but the teachers sometimes use school owned tablets with these students, who, therefore, will have experience of using mobile devices in school when they move up to secondary level. 250 students and five teachers are involved in BYOD at Tartu Tamme. 50 students at secondary level and 12 at primary level participate in BYOD in Palamuse. Their implementation strategy is to start at primary level and then expand up. This is due to the tight schedules that apply for teachers and students preparing for examinations. At Pelgulinna there are approximately 960 BYOD students. 60 teachers have had training but only some are actively implementing BYOD including 14 primary teachers, six secondary and four gymnasium level teachers. However, the situation is changing rapidly and more than half the teachers are now demanding training in how to use mobile devices in their classes.

### Benefits and successes

GAG report students participating more actively in lessons and that they perform tasks quicker using their own familiar devices. The digital skills of students and teachers are also improving. The school's reputation with regard to the implementation of IT has been enhanced. The school has been actively engaged in sharing their BYOD knowledge and good practice with other schools via a blog and five seminars on introducing ICT into the curriculum.

Riina Tralla, a teacher and educational technologist in Palamuse, has found that, “the devices allow for differentiated assignments which contribute to extended attention and development of the more accomplished students.” She notes that, “all skills acquired in class should preferably be repeated as home assignments” and use of the students' own mobile devices both in school and at home facilitates this.

Palamuse teachers find the *Showbie* app makes it very quick and easy for them to assign, collect, review and feedback on student work carried out on their tablets and smartphones. Estonian language students enjoy using the *Tellagami* app and the camera on their devices to make instant animated reports wherever they are.

Improvements in student motivation have been observed at Tartu Tamme and students are more interested in self-assessment and in acquiring subject knowledge. More participation in lessons has also been noted. Use of students' own mobile devices and the *Socrative* online response system provides fast automatic feedback on students' progress and which topics require additional explanation. In biology and physics lessons Socrative and *Padlet* virtual blackboards are "favourites for both teachers and students". In biology Socrative is used for self-assessment, discussing mistakes, learning new material and preparation for tests. Padlet is used for brainstorming, arranging ideas and collecting educational links discovered by students. Material collected on virtual blackboards can be collated and used as learning resources. Teachers say BYOD is helping develop students' digital competencies and enabling more economical use of time and resources including saving paper. Improved communication between Tartu Tamme students, teachers and parents has resulted from combining the use of students' mobile devices with the use of *eKool* a learning management tool used to share timetables, lesson descriptions, study resources, assignments, grades and information.

All primary level teachers at Pelgulinna use tablets (up from only four in 2013) and are responsible for their own maintenance with only occasional help needed.

## Challenges

The schools would appreciate clearer national direction on how to proceed with the digital agenda and initiatives to encourage creation of apps and online digital teaching materials. Also, there are few BYOD good practice examples for teachers to learn from and a shortage of apps and resources in the Estonian language.

Providing adequate Wi-Fi is a challenge. GAG's old building has prevented installation of a whole school Wi-Fi network. The Wi-Fi network Pelgulinna installed three or four years ago, part funded by the Government, can effectively support 350 concurrent users but BYOD has increased demand, with potentially over 1,000 students wishing to use the Wi-Fi. As a result, many of the 60% of students who have mobile network data contracts choose to go online this way instead of using the school Wi-Fi. This is not considered to be the best long term solution and teachers are concerned that planned improvements to the schools' broadband and Wi-Fi

services may not happen for two years.

Some parents in Palamuse do not allow their children to take their mobile devices to school as they are expensive and parents fear they may be broken. Others worry that some children may feel excluded if they do not have a smart device, or if it is not as good as those owned by their peers. Some Pelgulinna parents expressed concern that student use of mobile devices in school as well as at home could have adverse health implications. Others worry about the cost of tablets and smartphones or bullying.

Tartu Tamme has found it a challenge to involve a larger segment of teachers and students in BYOD methods and to make the use of students' own devices an integrated part of teaching and learning. In Palamuse it has been difficult to engage the teachers who teach older students as they prefer to teach in a very traditional way when preparing for important examinations. Pelgulinna find that secondary level teachers are generally less ICT literate, use technology less and work in teams less than primary teachers and as a result are more difficult to involve in BYOD.

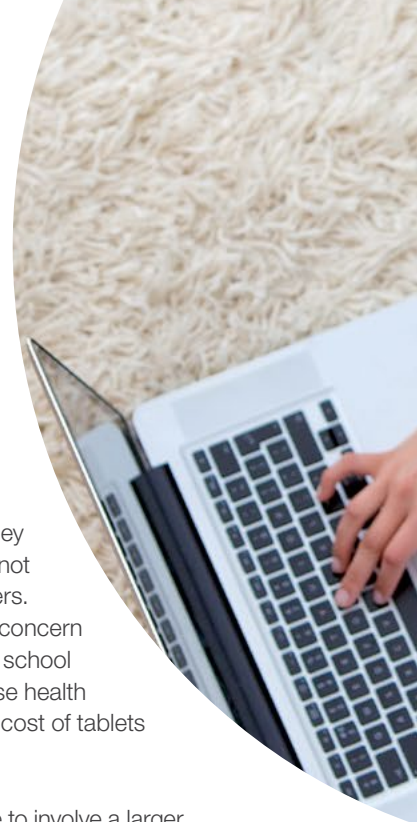
Most Pelgulinna gymnasium students own laptops but most of their teachers do not allow these in lessons. Students feel laptops are too heavy to bring into school if they may not be used, especially as they still have many books to carry.

All text books are planned to be digitised by 2018 and the school hopes to save money by having teachers develop their own workbooks that are very specific to their curriculum. However, many of the teachers require more training and more confidence in the use of the learning management system (*Moodle*).

## Lessons learned

Some of the many lessons learned by the schools can be summarised as follows.

- Excellent whole school Wi-Fi network is vital
- It is necessary to make arrangements for students who do not have smart devices.
- Mobile devices can be used very effectively to support students working collaboratively in pairs or small groups.





- A very effective way of promoting BYOD is to require tests to be carried out using technology; innovation in assessment can drive innovation in teaching practice.
- Teachers require training but they often have difficulty finding the time for this, especially if the training takes the form of set courses.
- Teacher “champions” who support their peers’ use of BYOD are very helpful for staff development and embedding BYOD.
- Offering teacher champions incentives other than money (e.g. conferences attendance, spa or cinema tickets, devices or prizes) avoids changing conditions of service and can continue if funding to pay champions stops.

### Teachers’ observations and advice

- Laptops still seem to be best at secondary and gymnasium levels whilst tablets are more convenient for primary students.
- Although some parents have, at least initially, some concerns, others are pleased that the school is teaching their children to do something useful with their mobiles.
- Acceptable use and behaviour rules are required; these help to prevent inappropriate use and reduce timewasting.
- Teachers need their own individual digital device as well as training and support from an in-house educational technologist.
- Teachers who are less experienced in ICT need both educational technologist support and inspiration.
- Some teachers prefer BYOD to using school owned devices with students as they do not want responsibility for setting up and maintaining devices or worrying about breakages. With BYOD, students are responsible for their own devices and look after them better than school devices and, as a result, damage is very rare.
- Teachers will not wish to allow the use of students’ devices in class if they cannot perceive a benefit in doing so. It is necessary to find ways of motivating teachers.

Ingrid Maadvere at GAG says, “It is the school’s task to prepare students for their future and using technology is unavoidable.”

Rinna Tralla in Palamuse advises that meticulous planning of the first lesson is important; teachers and students must have a chance to familiarise themselves with the devices. Preparation time always exceeds your original expectations. Apps to be used in class should be tested in advance in the same room and with the same internet connection and have extra chargers and power socket extensions available to recharge batteries.

Birgy Lorenz at Pelgulinna says: “It is usually a mistake to say ‘this is fun’. It is not, it is serious learning and you can upset parents if they think using mobile devices in school is just a game”. She advises teachers to tell students to load apps that will be used in lessons in advance to save time in lessons and so that the teacher need not worry about getting apps onto the students’ diverse devices. Schools can avoid disconnected pockets of good practice by building a community of teachers (the innovators or teachers of particular subjects) who want to use technology. Give the community a name and recognised leaders to whom others will turn for help

Urmas Tokko at Tartu Tamme advises sharing the experiences with colleagues in other schools and among teachers of the same subject who are learning and testing new similar technologies and methods.