

Subject curriculum review questionnaire

+ Everything was clearly written and this makes teachers easier to implement it.

- As I don't know your country contexts so much then the review might be too critical as I am looking from the eyes it would work in Estonia

1. Are the learning outcomes and educational content appropriate for the developmental age of students?

1 – inappropriate	2 – appropriate to a certain extent	3 – mostly appropriate	4 – completely appropriate
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Please explain what should be modified if Your answer is 1, 2 or 3.

As I don't have information do you have a program also for kindergarten then it seems that you push children and teachers too hard in this early age. In one hand the program layers out nicely on paper and it is easy to read, but in my opinion, it levels up too quickly. Regarding the concept, I understand that what is written must be achieved by everyone and I am a bit worried that not everyone would be able to do all of that. In Estonia we have a different system, we need to achieve goals example in 3rd grade, not in every grade. This gives teachers more possibilities to teach according to the student readiness. Even then its a bit too much. At least in Estonia, it would be too much.

Some examples:

1st grade D. 1. 1 uses information and communication equipment carefully and responsibly and protects his personal data

This would mean much more other concepts that are taught in other lessons as well – why we need an account, whom we will connect etc. This pushes students too early to use internet with strangers in my opinion. As a teacher, I would happily explain that in 3rd grade, not in 1st.

2nd grade B. 2. 1 analyses a set of instructions that perform a simple task and corrects the wrong order if needed

This would mean that students are given a really simple task or it would be a bit impossible as they just started to read and write, how they can solve this kind of puzzles. Also, those how to have special needs for them it would be really hard to do it as they don't see this kind of mistakes. This would be a good goal for 5th graders.

D. 2. 2 uses e-services in the area of training and education

What kind of e-services do you have? I would not push my students to online learning spaces in this age.. only when it is a really simple environment that is school managed etc. These environments should be children friendly. Example Moodle and English based Cloud solutions are not☺

3rd grade

A. 3. 2 explains and analyses simple hardware/software problems and obstacles that can occur when using them.

This means that the students understand English very well or you have all translated into your languages.

C. 3. 4 distinguishes between roles and activities required by the cooperative online environment.

I am reading from it that everyone knows how to be a moderator etc. This is the task where the adults struggle. I also wonder about the student's readiness to that. This also shows that they are pushed to use technology for communication too early as after that they will start to use it also to do harm, bully, pranks etc. I would raise that goal to 5-6th grade.

And it goes on. I would recommend to include primary teachers to discuss them are some of the goals achievable and are they age appropriate and how they click with other subject's curriculums. As even in Estonia we push also 1.-3. and 4.-6th graders to do things that are supported by the other subjects in 7-9th grade as the technology pushes us to teach things too soon. And because of it, I am also seeing problems arising from it in Estonia. There should be an agreement with other subjects how we can support each other better. In Estonia, the goal is also that some of the topics must be reached inside another subject and they should not be part of Computer Science curricula, probably you have the same challenge. example safety and learning communities and other can be a teacher in natural science and languages in a more natural way, this leaves room for other IT new trends and technologies.

In an upper part, the employers can tell you more what skills they need from the students. In Estonia, they are telling us that they need people that know the clock and deliver thins and ask for help, other work skills they can teach. As they don't know themselves what kind of skills are needed in technology (in every filed will be using technologies, but what are the specific skills to medicine or working in forests

they don't know yet. in the curricula, you are listing also in ICT sector requirements and some government sector ones as well but the others?). So in there the main question is - does this curriculum support also developments in other work branches or only in 2 sectors? Also, the skills mentioned in the upper level are high and deep only in problem-solving and coding part, not in other sections. So I advise looking into that.

2. Are the learning outcomes and educational content appropriate for the number of classes?

1 – inappropriate	2 – appropriate to a certain extent	3 – mostly appropriate	4 – completely appropriate
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Please explain what should be modified if Your answer is 1, 2 or 3.

Depending on the extra material provided and examples it can be ok. To keep it short and simple☺ I would recommend maybe to write only up to 1-3 goals in every domain. For now, you will give teachers and students different 16+ goals to tackle every year and this is too much. 4-9 goals in one-year according to the age of the students might be more achievable and also understandable to teachers and students. When you ask too much the freedom will be lost that is explained in the end about teaching practices. Then also teachers and students can focus more on doing something deeper level, not just run over the topics. Then they can apply these skills also, not be in „knowing“ and „understanding“ level as it is mentioned through the curricula.

3. Are the domains that are necessary for the Informatics area well represented?

1 – no	2 – to a certain extent	3 - mostly	4 - completely
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Please explain what should be modified if Your answer is 1, 2 or 3.

As I already mentioned in Estonia we have a different approach and I am answering in a way when this program would be implemented here. Maybe in your country, it is according to your plans and strategies that you have to your country to be the „country that has most employable (probably male) coders“. I am hinting that in Estonia girls would be more interested also to broader things than just coding. As the topics/goals for coding run deep and for the other domains it does not run equal deep level.. example even in 8th grade in one domain they are asked to develop and another just to describe or see what is online.. it does not seem deep to me - how the things are applied in Information and digital technology, or literacy or e-society. The example in Estonia we have a goal that they would give a suggestion or plan to create e-services for the youth or they make the online community to raise ones awareness etc. We want active citizens as they can vote from age 16 in local elections now.

New and arising technologies should be more visible in the curricula.

In Estonia we are offering 3D printing and other IoT tools to be used in 1.-3.rd grade, you see them as part of the basic school upper level or focus more on coding than the possibility that in ICT business there is more than coders. I am seeing it as a potential flaw in the model. What happens when you have put all the eggs in one „coding“ basket?

Coding as a career last around 5-15 years and then they are fed up with that or move to another higher level or other tasks. In the ICT there is more needed problem solvers, skills to communicate,

develop and design, to be flexible etc. So what kind of skillset you are providing to help to find different career possibilities, this in my mind can be written and explained more.

I would also recommend to focus on digital hygiene and also cybersecurity is as this is a skill that can be used to educate mainstream – everyone will have challenges because of the behaviors, not because one coded or administrated the system poorly (this can be fixed easily). Also when you focus on programming so much, then you must focus on cybersecurity (defense and offense) also as when students make bad code with holes.. or others cannot administrate it what they have created (usability issues).

3. Does the curriculum contain an adequate ratio of the breadth and depth of knowledge, skills, and attitudes in the Informatics area?

1 – no	2 – to a certain extent	3 - mostly	4 - completely
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Please explain what should be modified if Your answer is 1, 2 or 3.

Attitudes should be more focused as they are the ones that last longer.

Depth can be deeper in the areas of Information and Digital Technology, Digital Literacy and Communication, e-Society and less depth would be needed in Computational Thinking and Programming.

Breadth.. depends on the hours that the teacher can focus on the topic. As I am seeing a lot of amount of hours spent on doing it, then it might be that the breath part is ok. In Estonia, we are not spending too much time (at least not as much you are proposing) on ICT lessons. The results can be achievable spent less time on that (when we include ICT to every subject in the school). The challenge is also that in every 3-6 years the technology will develop and switch.. those skills that you write into the curricula must be valid 12 years later or longer.

I don't know myself what technologies are there available 2029, do we even program in a way or other. So to spent on loads of hours every year in a field that is also regulated by the Information society development (meaning that lot os skills students will learn themselves anyway at home and leisure time), it probably is not that vise. I would prefer them to learn languages and creativity and flexibility and do projects and development exercises (robotics, virtual reality etc) etc. As these skills are far more needed that knowing how to program of use e-learning environment that goes out of business in 3 years (in a modern startup world). If you still consider that amount of time is appropriate then don't fell in the hole that ICT lessons will solve everyone else subjects challenges. Problems can be solved where they occur, not somewhere else. Meaning IT cant solve math and language challenges by just doing it in IT lessons.

As I don't know your country philosophy on that.. maybe you have discussed all of that and already looked all the potential future scenarios...

Page 27 Figure 3 – it might also give analytical and research skills that are needed both in university level and in the industry.. I recommend looking higher goals in Bloom's taxonomy that using, identifying level. In Figure 4 listed Health and Entrepreneurship should be more explained in the goals. Maybe to include also research skills?

5. Does the curriculum, especially as regards the proposals in chapters F and G (Learning and teaching, Assessment), enable the acquisition of the listed learning outcomes?

1 – no

2 – to a certain extent

3 - mostly

4 - **completely**

Please explain what should be modified if Your answer is 1, 2 or 3.

It has taken around 10 years in Estonia to start implementing new ways of teaching and to see the student as a partner. Student-centered teaching methods and school where the student are given choices and responsibility is the way to go, but how far are your supporting mechanisms? An example is it done already as a normal practice in every lesson or is the Computer Science the first one? As then it is a really hard way..as teachers see themselves valuable only when they are considered to be teachers (higher people) not when they are equals.

From reading the goals and tasks for the students in the beginning parts it seems it is written in a way that the teacher is still in charges and a boss, not that student is provided with many options – because there is too much to do. Example when everything is mandatory then the program is really overbooked and when someone (student) decides that they would like to focus example on design and not coding then the curricula just falls apart and the teacher is put in a situation where he/she cannot be a partner and more and students will not have choice. So in this curricula, it's really hard to find time to focus on a deeper level (only in the deep level emerge when it is done in the are of coding).

But in F and G this is the way to go and push your teachers, but at the same time. If you are giving them autonomy and freedom to choose topics also from the curricula what they want to experience with students and to do. Then the curricula cannot be mandatory and be evaluated externally fro, everyone.

Freedom brings freedom. When you put teachers in the situation that they still have really hard goals to be achieved then they will take freedom away from the students. It works only this way.

In Estonia, we have announced that the curricula are optional, but we will start to do testing regarding the curricula and projects. Teachers and students have a choice to do whatever, we trust them, but thru external evaluation and also providing good materials we give them an easy way out, just to do things in our way. Social manipulation you can call it.

In Estonia page 30, the questions would be.

*Why we are even doing it (if there is no need, we will not do it)

* How you want to do it (possible methodologies and evaluation) – freedom of choice

* What is needed to do it (involved focus groups and tools, proper skills, permissions, safety level)

Possibilities for teachers how to do it - that's good, smaller groups and lot of freedom is good. At the same time.. in real life.. at school: funding goes down, you need an amount of teachers you currently probably don't have and then in REAL schools will push 30 students in the class and all of the freedom and deep level learning cannot be done in this way. Then it looks again like 19th-century factory model. Also then you lose the freedom, tailor-made solutions, raise ability to use distance learning – then it suggests that some of the teachings will be automated? Automated solutions can be used as MOOCs and then people will start to ask what you give to the schools loads of technologies, 1 teacher per 15 students when some of the skills can be taught with 200 students in one MOOC. This is the reality in many EU countries.. and when I am looking at your curricula then it can be automated in that way at least 50%. Maybe to write there more skills that really need teachers input, and other that can be automated.. should be automated by the IT solutions (example coding exercises etc).

6. Are the proposed learning outcomes and other elements of the curriculum in line with the European and global recommendations (e.g. DigComp, UNESCO ICT competency framework, Better Internet for Kids etc.)?

1 – no

2 – to a certain extent

3 - mostly

4 - completely

Please explain what should be modified if Your answer is 1, 2 or 3.

DIGCOMP is reached. But I advise little criticism towards that and also include your country view of the future that you are providing to your children. EU provided solutions are good quality – suits for everyone.. one size fit all. Its ok, but you should tailor something special or unique also what would be something that every country and company in the world will come to ask you – this is something I am missing. What is unique in Horvatia?

8. Are the learning outcomes and educational content comparable with those in Your country?

We have a different approach to the problem. The words can be same but the way we do it differs. We also focus on more different skills (higher level), research and soon see implement also different work/subject special ICT skills competencies to our curricula. We include the future technologies and don't focus on the sole deeper level in coding. It seems also that we provide teachers and students more freedom.

9. Please suggest other modifications if You consider them necessary.

KIS – Keep it Simple!

Think of the young age group and their supporting subjects and skills, topics. Can they really do it in a way you are hoping? Think of the teachers, how they provide that kind of pressure with all of the children (special needs and those who doesn't want to learn the IT language) and think how they concur the heavy rules of the curricula and then provide freedom for the students.

Also to train that amount and higher IT skills teachers to do it, it takes at least 3-4 years and loads of funds. (And this means you have needed people to take somewhere (from other subjects or from teacher training.. in Estonia.. we don't have that much). Also, it takes a lot of nerves and probably create many not happy teachers and school leaders. Depending on your country stsyem.. in Estonia.. the teacher's classroom in autonomous – we cannot mess it up. Maybe your country culture is different and you can.. really don't know. but when you have traditional system and system that is like in military.. then I wonder.. how there can be freedom in the military system for children? As children, you want to provide freedoms.

10. Your conclusion about the proposed curriculum.

In one hand make it easier according to the child age (primary part) and in another include higher skills (secondary and upper part), not only coding and problem-solving skills.

Think of your country specialty – what is unique from others? Think of different areas of work not only coders and government sector. Explain more research and entrepreneurship (projects part) – these are the real-life skills! Think of more of the skills needed overall – in 2030-2050 – basically see the future!

I hope you all the best!

Birgy Lorenz, Informatics teacher and researcher from Estonia.